5531

Walk Around

C-130 Hercules

Walk Around Number 31

squadron/signal publications

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By Lou Drendel

Color by Lou Drendel and Don Greer

Illustrated by Dave Gebhardt and Darren Glenn

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Introduction

The Lockheed (now Lockheed Martin) **C-130 Hercules** is one of the most remarkable aircraft ever built. It is remarkable for its extreme versatility, adaptability, and its as-yet-undetermined longevity.

The US Air Force (USAF) requirement called for a transport that could land on unimproved ground, be extremely rugged, be primarily for cargo transport, and have a troop-carrying capability. It would carry a load of 30,000 pounds (13,608 KG) over a range of 1500 nautical miles (1727.3 miles/2779.7 KM). Boeing, Douglas, Fairchild, and Lockheed all responded to the Request for Proposals (RFP) issued on 21 April 1951. The Lockheed proposal, authored by the design team under Willis Hawkins, was accepted on 11 July 1951.

It is worth noting that contemporary high-speed passenger and cargo-carrying capabilities were embodied by the piston-engined Lockheed L-1649 Starliner (Super Constellation) and turboprop powered Lockheed L-188 Electra and Vickers Viscount airliners. Lockheed's proposed transport had a projected cruise speed of 360 MPH (579.3 KMH), close to the fastest airliners then in service. It would also carry 40,000 pounds (18,144 KG) of cargo in a fully pressurized cargo compartment. Remarkably, this concept swiftly became a production reality.

The USAF Production Contract for 219 **C-130A**s was issued on 19 September 1952. Lockheed planned to assemble the Hercules at their Marietta, Georgia factory and a full size wooden mockup of the production aircraft was shipped from Burbank, California to Georgia. The first of two prototype **YC-130**s (53-3396) rolled out of Lockheed's Burbank factory in August of 1954. Stan Beltz and Roy Wimmer flew the second prototype (53-3397) on the type's first flight on 23 August 1954. The first production Hercules (53-3129) rolled out of the Marietta plant on 10 March 1955 and first flew on 7 April 1955. It was delivered to the 463rd Troop Carrier Wing at Ardmore Air Force Base (AFB), Oklahoma on 9 December 1955.

My first experience with the C-130 came on 24 October 1956, as a member of the 325th Airborne Infantry Regiment, 82nd Airborne Division. My 16th parachute jump was made in conjunction with the Continental Army Test Board at Fort Bragg, North Carolina. The aircraft was one of the prototype YC-130s, flown to Pope AFB, North Carolina for the first test of Hercules paratroop drops. It is a measure of how successful the basic design was that the Hercules was fully integrated into the inventory less than two years later.

Lockheed announced the **C-130B** in August of 1957. Larger engines and increased fuel capacity in the wings raised the B's gross weight to 135,000 pounds (61,236 KG) from the C-130A's 124,000 pounds (56,246.4 KG). The C-130B was also the first Hercules to fly with four-bladed Hamilton Standard hydromatic 54H60-39 propellers, which became standard on every variant before the current **C-130J**. The first C-130B was rolled out in September of 1958 and made its first flight on 20 November 1958. Lockheed delivered 134 Bs to the USAF.

There was no C-130C, but ten As were modified for service in the Arctic and re-designated as **C-130D**s. The modifications included installing skis on the main and nose gear, increasing fuel capacity, and providing for Jet-Assisted Take Off (JATO).

The **C-130E** introduced several improvements that made it the most popular military transport in service. Lockheed built 491 Es, including four **C-130G**s for the US Navy and one **EC-130E**. The C-130E's ramp weight increased to 155,000 pounds (70,308 kg), most of which was accounted for by the addition of 17,000 pounds (7711.2 KG) of fuel. More powerful Allison T-56-A-7 engines were standard and the external tanks moved from outboard of the engines to a position between the engines.

The most-produced version of the Hercules was the **C-130H**, which was introduced in 1974. Lockheed built 1087 Hs, which employed the 4910 shaft horsepower (SHP) T56-A-15 engine. This variant featured a strengthened wing box that was eventually installed on all previous C-130s, except for the early C-130As. Conceived as an export version, the C-130H made its first flight on 19 November 1964, but did not enter USAF service until 1975. The C-130H formed the basis for the **AC-130U** special operations gunship.

The best validation for any product is its demand. By that measure, the C-130 is one of the best aircraft ever built. More than 60 countries operate the Hercules. The C-130's adaptability to a variety of missions – most of which did not even exist at the time of the Hercules' introduction – is another indication of the superiority of this design.

Acknowledgements

This book has come to fruition thanks to the interest and generosity of several individuals. John Gourley provided a CD of digital images of exactly the right quality and scope to make the job of detailing the special operations aircraft possible. Ron Leonard and Damon Blair both have long associations with the C-130 and were generous enough to loan me significant portions of their collections. The C-130 generates a tremendous following and much of the aircraft's history can be seen on the worldwide web.

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(Front Cover) The AC-130U gunship is the latest and most complex Hercules variant to enter service. It demonstrates its awesome firepower by firing away with (from aircraft front) 25MM, 40MM, and 105MM cannon. This AC-130U is assigned to the 4th Special Operations Squadron (SOS), 16th Special Operations Wing (SOW) at Hurlburt Field, Florida.

(Previous Page) A C-130E Hercules demonstrates its rough field ability by landing on a dirt strip and fully reversing the propeller pitch to stop. This reverse pitch feature also enables the Hercules to back into a parking spot. (USAF)

(Rear Cover) The MC-130H COMBAT TALON II carries US Special Operations troops into combat, preferably under cover of darkness. Its enlarged radome houses a terrain-finding radar for night and all-weather flights. MC-130Hs are assigned to Special Operations Squadrons based in Florida, England, and Okinawa.

This Hercules (54-1632) was the 19th C-130A produced by Lockheed's Marietta, Georgia plant. It has the original 'Roman Nose' covering the Bendix AN/APS-42 radar antenna. C-130As were originally equipped with 15-foot (4.6 M) diameter three-bladed Curtiss TurboElectric propellers. Two 450 gallon (1703.4 L) external fuel tanks are mounted outboard of the engines. This C-130A assigned to the 1370th Photo Mapping Wing (PMW) at Turner Air Force Base (AFB), Georgia is parked at Forbes AFB, Kansas in May of 1968. The 0 (zero) prefacing the tail number indicated an aircraft over ten years old. (Jerry Geer)

A C-130A (55-0026) assigned to the Tactical Air Command (TAC) rests on the tarmac at Cedar Rapids, Iowa in August of 1964. This Hercules incorporated the elongated nose for the Sperry AN/APA-59 radar, which replaced the earlier AN/APS-42 set. The aircraft is left in natural metal with the TAC insignia painted on a yellow and red lightning bolt on the tail. (Jerry Geer)

The C-130B was the first Hercules variant equipped with four-bladed Hamilton Standard hydromatic 54H60-39 propellers. These were ultimately retrofitted to most C-130As and became standard for all C-130s until the C-130J. The four-bladed propellers offered less vibration and noise than the earlier three-bladed units. This Pakistan Air Force C-130B (F/62-4141) visited Prestwick, Scotland in 1969. (Via Jerry Geer)

A CC-130 Hercules (130307) assigned to 8 Wing, Canadian Forces – Air Command is displayed at London, Ontario in May of 1994. This C-130E (64-17626) was one of 16 Es delivered to Canada. The aircraft is painted in a two-tone gray scheme with low visibility markings. Canadian Hercules aircraft were painted in various finishes, including high visibility white and natural metal and a three-tone camouflage. Canada's CC-130s are based at Canadian Forces Base (CFB) Trenton, Ontario. (Lou Drendel)

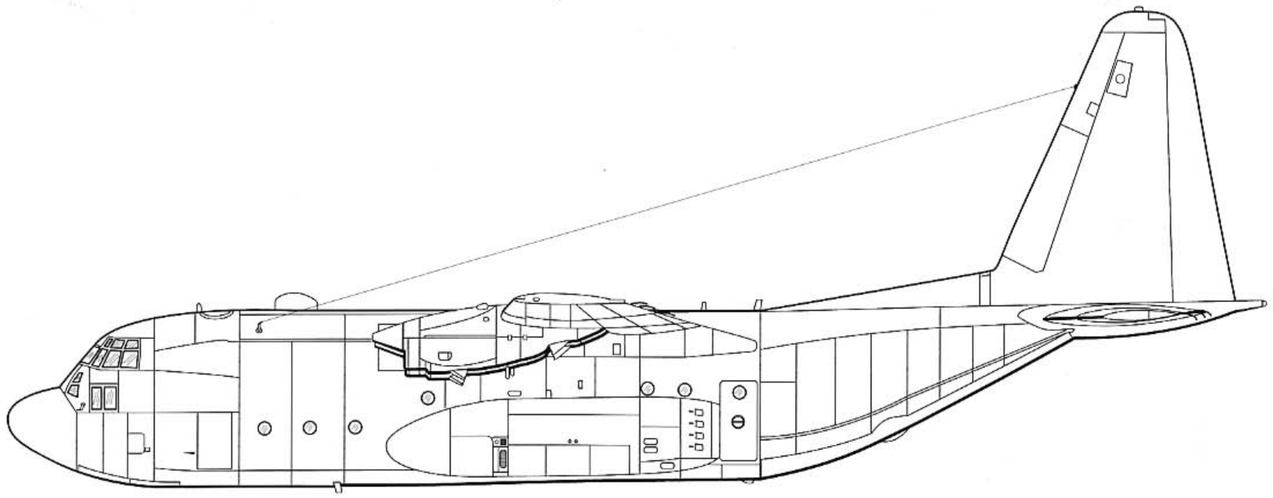
A C-130E (CI/62-1801) assigned to the 115th Airlift Squadron (AS), 146th Airlift Wing (AW), California Air National Guard (ANG) flies low on 22 April 1998. This unit is based at Channel Islands Air National Guard Station (ANGS). The C-130E introduced larger 1360 gallon (5148.1 L) external fuel tanks, which were mounted between the engine nacelles. Internal fuel capacity increased from the C-130B's 5050 gallons (19,116.3 L) to 6960 gallons (26,346.4 L). Lockheed delivered the first C-130E to TAC on 27 March 1969. (Ted Carlson/Fotodynamics)

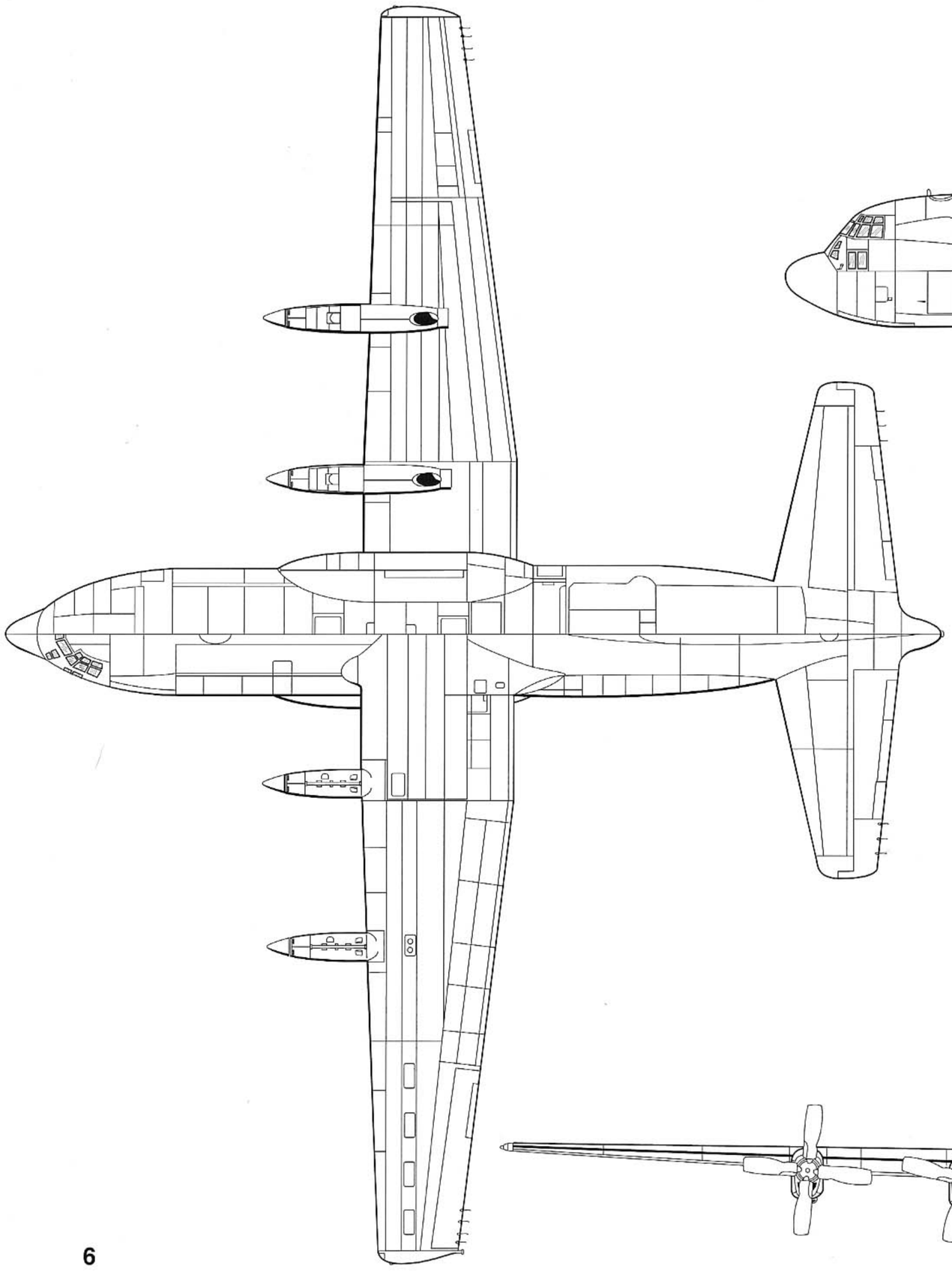
A C-130H assigned to the 43rd AW flies low over the Atlantic Ocean. The Wing is based at Pope AFB, North Carolina – adjacent to Fort Bragg, home of the US Army's 82nd Airborne Division. This aircraft is painted overall AMC Proud Gray (FS26173), the current standard finish for Air Mobility Command (AMC) tactical and strategic transport aircraft. POPE and stripes are white on the blue tail band. A black griffin is painted under the cockpit windows. Lockheed conceived the C-130H as an export model and delivered the first examples to New Zealand in 1964. The USAF did not accept its first C-130H until 1975. (USAF)

The latest Hercules variant is the C-130J, which first rolled off the assembly line on 18 October 1995 and initially flew on 5 April 1996. It features six-bladed propellers and updated flight systems. The Maryland ANG's 135th AS, 175th Wing (Wg) is the first US unit to fly the C-130J, which is intended to replace the C-130E. Lockheed Martin also offers the C-130J-30, whose fuselage is stretched 15 feet (4.6 M) to 112 feet 9 inches (34.4 M). (Lockheed Martin)

The 2000th Hercules built was this C-130H (91-1231) delivered to the 165th AS, 123rd AW, Kentucky ANG at Standiford Field, Louisville on 15 May 1992. This marked 35 years of continuous Hercules production – the longest ever for a transport aircraft. Special markings are painted on the vertical tail below the serial number. The 165th AS is one of 29 ANG squadrons flying C-130s. (Lockheed Photo by John Rossino)

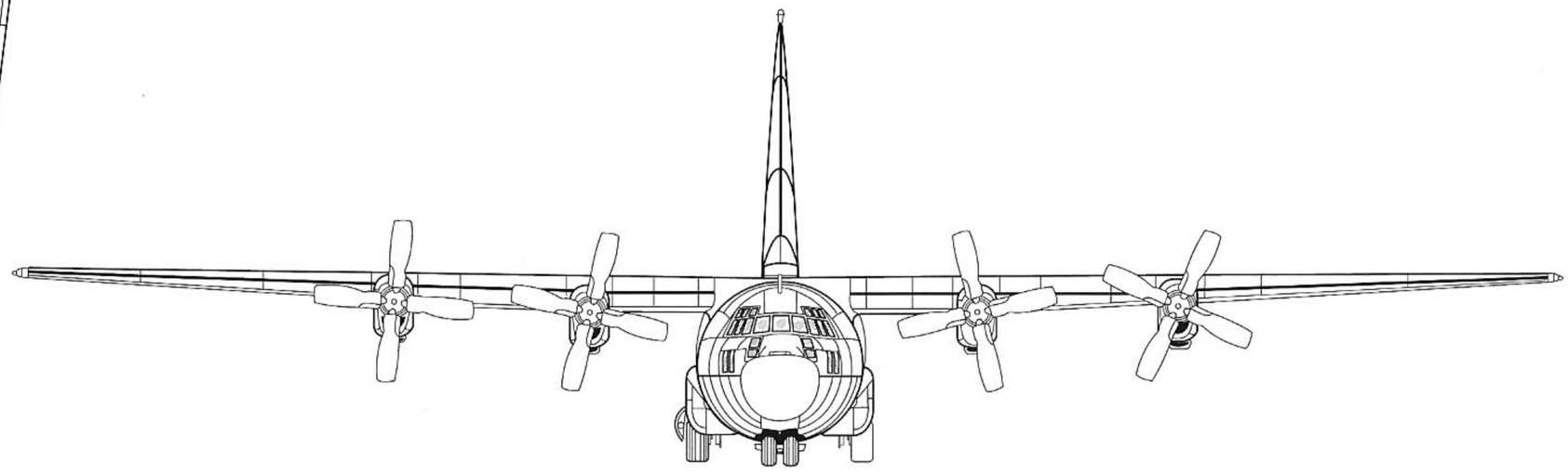
This C-130H (85-0042) was assigned to the 357th AS, 908th AW at Maxwell AFB, Alabama in September of 1999. The Squadron is one of 16 Air Force Reserve Command (AFRC) C-130 units. This Hercules is painted in the 'European I' overall camouflage scheme of Dark Green (FS34079), Gunship Green (FS34092), and Gunship Gray (FS36118). The current AMC Proud Gray finish replaced this scheme from the early 1990s. The blue tail band below the American flag has MAXWELL in white. (Lou Drendel)

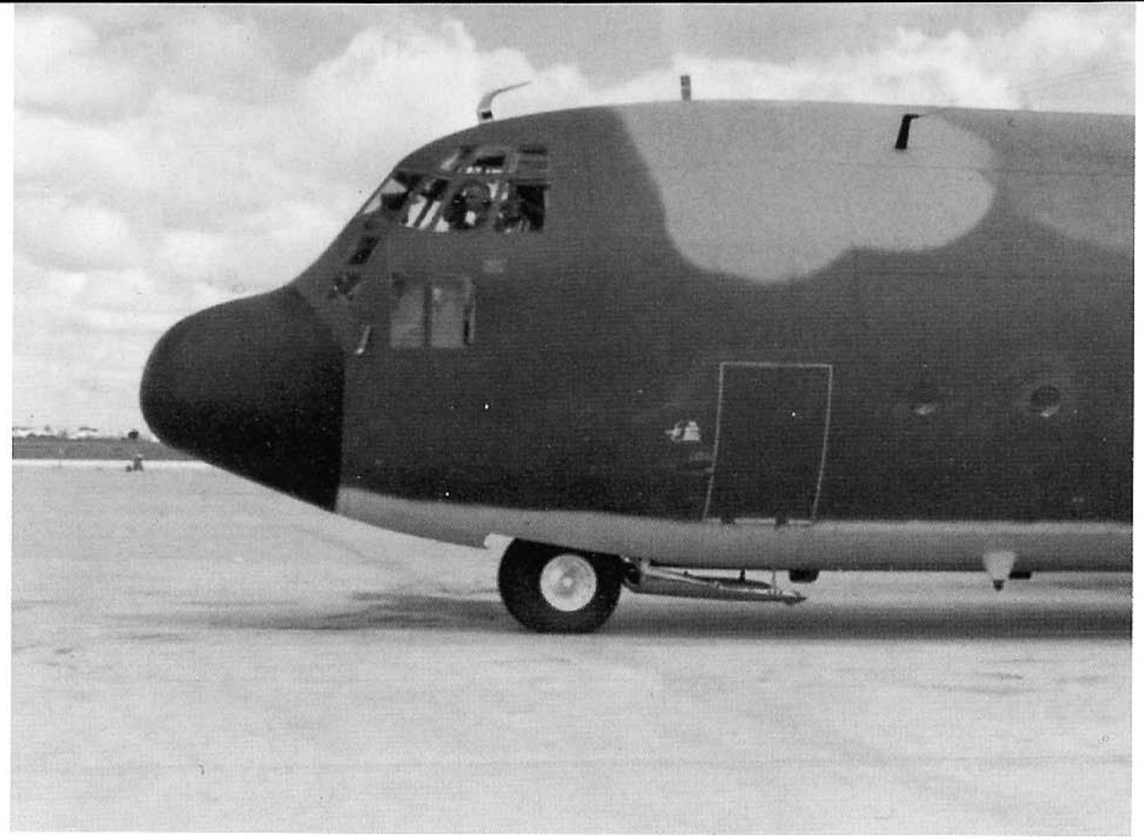




Lockheed C-130H Hercules Specifications

Wingspan:.....132 feet 7 inches (40.4 M)
Length:.....97 feet 9 inches (29.8 M)
Height:.....38 feet 4.5 inches (11.7 M)
Empty Weight:.....72,892 pounds (33,063.8 KG)
Maximum Weight:..175,000 pounds (79,380 KG)
Powerplant:.....Four 4910 SHP Allison T56-A-15 turboprop engines
Armament:.....None
Performance:
Maximum Speed:.384 MPH (618 KMH)
Service Ceiling:....26,500 feet (8077.2 M)
Range:.....5050 miles (8127 KM)
Crew:.....Five





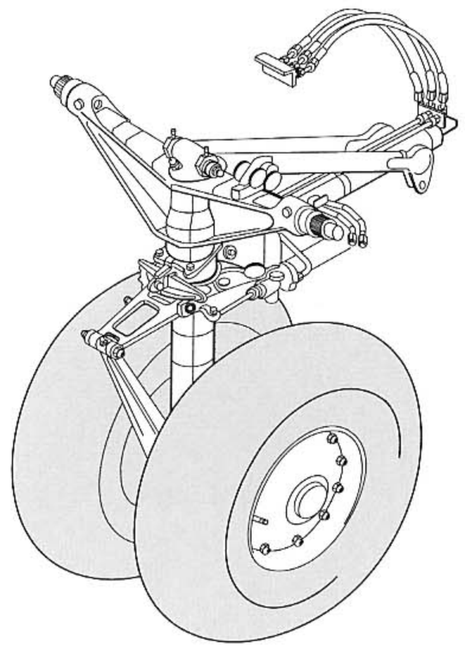
The C-130's nose landing gear employed two wheels flanking a single strut. Two nose gear doors cover this bay, with the forward door lying flush against the fuselage undersurface except during gear extension and retraction. The rear door moves aft on extension and closes forward during retraction. This latter door replaced the two aft doors mounted on the first 15 C-130As. (Wayne Mutza)

The dual, steerable nose gear swings down and aft for extension using hydraulic pressure. It can be visually checked for extension through a nose landing gear inspection window on the aft bulkhead of the nose wheel well under the flight deck. It can also be cranked down in the case of loss of hydraulic pressure. There is no provision for manual retraction. Landing gear struts and bays are Glossy White (FS17875). (Lou Drendel)

C-130 Variants

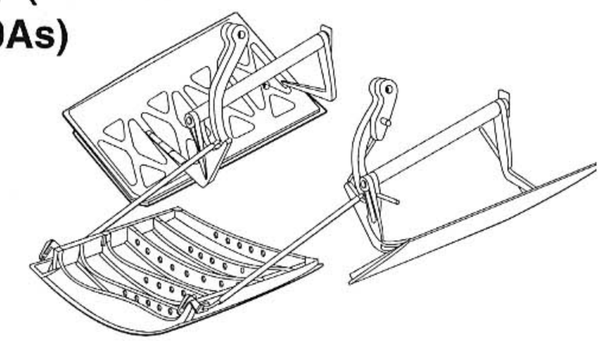
C-130	Standard Cargo Transport
AC-130	Special Operations Gunship Variant
DC-130	Drone Controller Aircraft
EC-130	Electronic Warfare Aircraft; Specialized Sub-Variants for Airborne Command and Control, Psychological Warfare, Electronic Intelligence, and Electronic Jamming
HC-130	Search and Rescue Aircraft
KC-130	Aerial Refueling Tanker/Transport
LC-130	Polar Operations Transport with Ski Landing Gear
MC-130	Special Operations Transport Capable of Landing and Recovering Personnel
WC-130	Weather Reconnaissance Aircraft

Nose Landing Gear

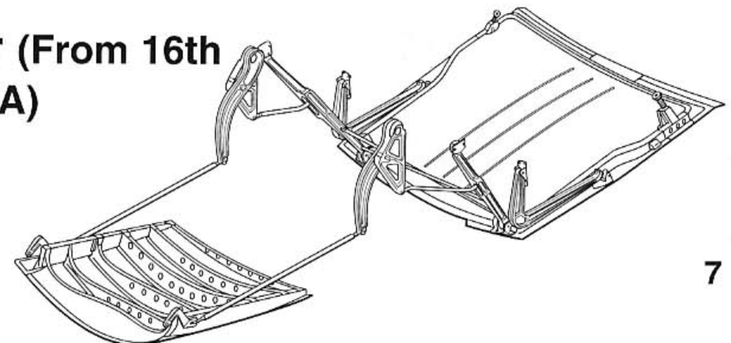


Nose Landing Gear Doors

Early (First 15 C-130As)



Later (From 16th C-130A)



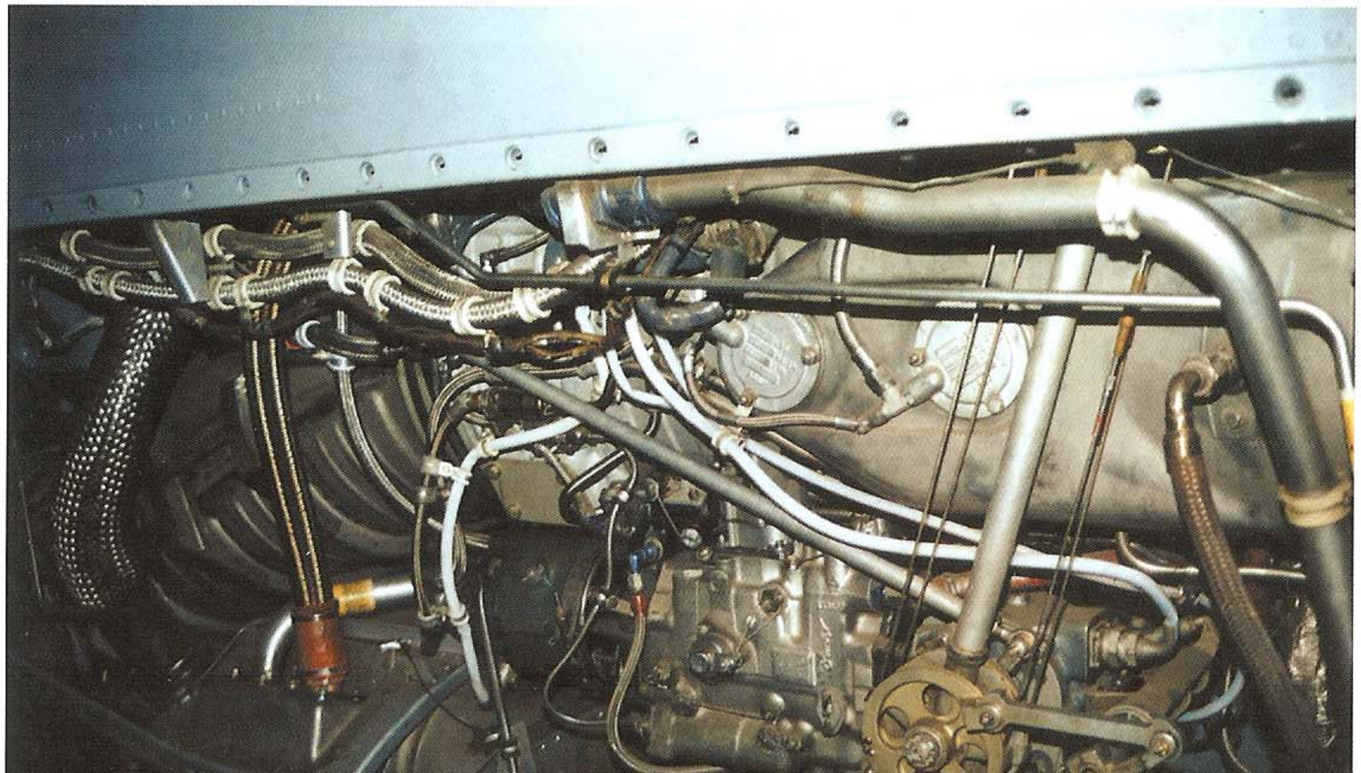
Four Allison T56-A-7 turboprop engines power the C-130B/E and HC-130 variants. This engine has a takeoff rating of 3755 shaft horsepower (SHP) at 13,820 revolutions per minute (RPM). The T-56-A-7's maximum torque is 19,600 inch-pounds, which yields 4300 SHP. (Lou Drendel)

The T56 is enclosed within a close-fitting cowling mounted to the wing leading edge. The large intake under the spinner supplies air to the engine, while the smaller intake under the nacelle supplies air to the oil cooler. The oil cooler exhaust door on the cowling undersurface is open. Exhaust gases are vented through the duct on the lower nacelle. (Lou Drendel)

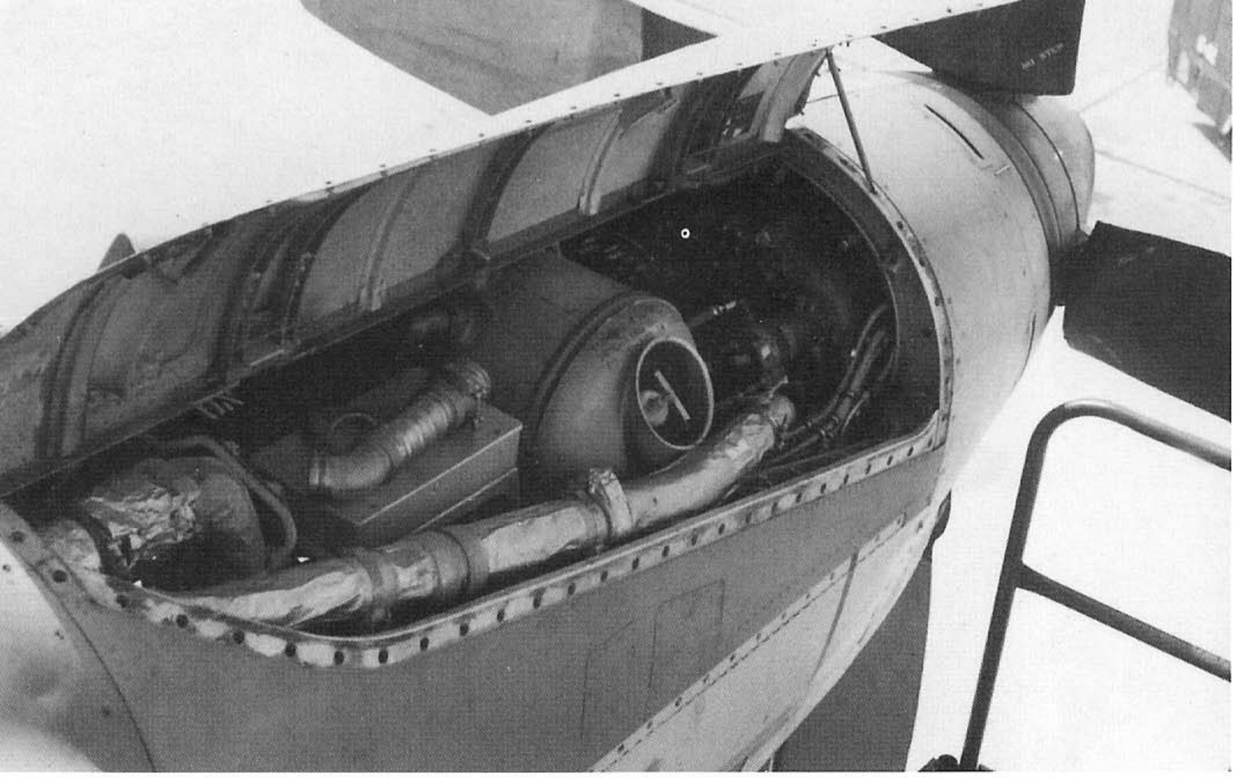
A quartet of 4300 SHP T56-A-15 engines power the C-130H Hercules. These engines are equipped with a reduction gear assembly, which provides an overall reduction of 13.54 to 1 between engine speed (13,820 RPM) and propeller shaft speed (1021 RPM). The T56 engine has a 14-stage axial flow compressor, a set of six combustion chambers of the through-flow type, and a four-stage turbine. Inlet air enters the compressor and is progressively compressed through the 14 compressor stages. The compressed air (at approximately 125 pounds per square inch; PSI) flows through a diffuser into the combustion chambers and burns. This increases the temperature from 600˚F (315.6˚C) and thereby the energy of the gases. While the gases pass through the turbine, they cause the turbine to rotate and drive the compressor, propeller, and accessories. Some residual thrust is available via the exhausted gases. (Lou Drendel)

The curved exhaust section is joined to the T56 engine's turbine section. The turbine area, in turn, is mounted to the combustion section. T56 series engines are 146 inches (370.8 CM) long, 27 inches (68.6 CM) wide, and between 39 and 44 inches (99.1 and 111.8 CM) high. They weigh between 1825 and 1895 pounds (827.8 and 859.6 KG), depending upon the variant. All T56s burn either JP-4 or JP-5 jet fuel. (Ron Leonard)

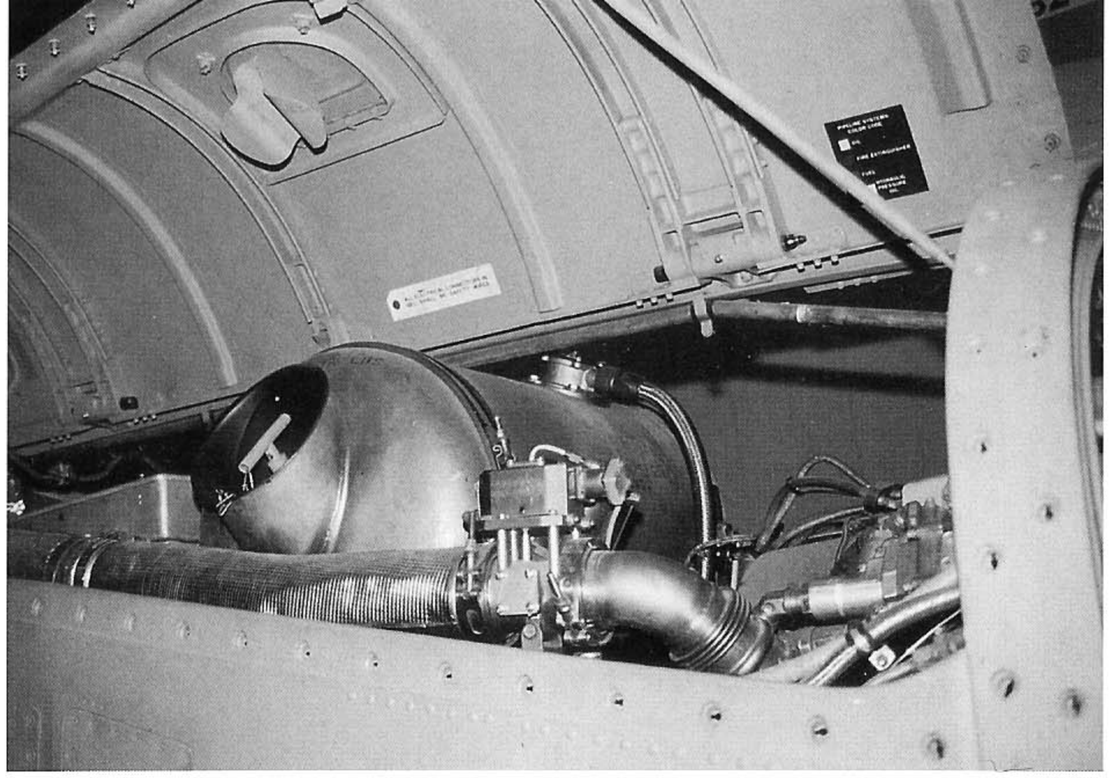
The T56's cold section consists of the compressor section and the accessory drive housing immediately below the compressor. Intake air is increased in pressure and temperature by the compressor before it passes to the combustion section. The port lower nacelle access panel was removed to service this engine. (Ron Leonard)



The power and gearbox sections are installed within an aerodynamic nacelle structure, which supports the C-130's power section. The area immediately aft of the exhaust duct is painted black on some Hercules aircraft to hide the exhaust staining. Most of the engine's thrust comes from the 13 foot 6 inches (4.1 M) diameter Hamilton Standard propeller. (Lou Drendel)



The most prominent feature under the T56 engine's upper cowl is the 12 gallon (45.4 L) engine oil tank. The propeller reduction box is just under the cowl behind the propeller. An air-driven engine starter is installed on the reduction gearbox. Air is supplied to the bleed air manifold from the Gas Turbine Compressor (GTC) mounted in the port main wheel well, from another operating engine, or from an external source of compressed air. (Ron Leonard)

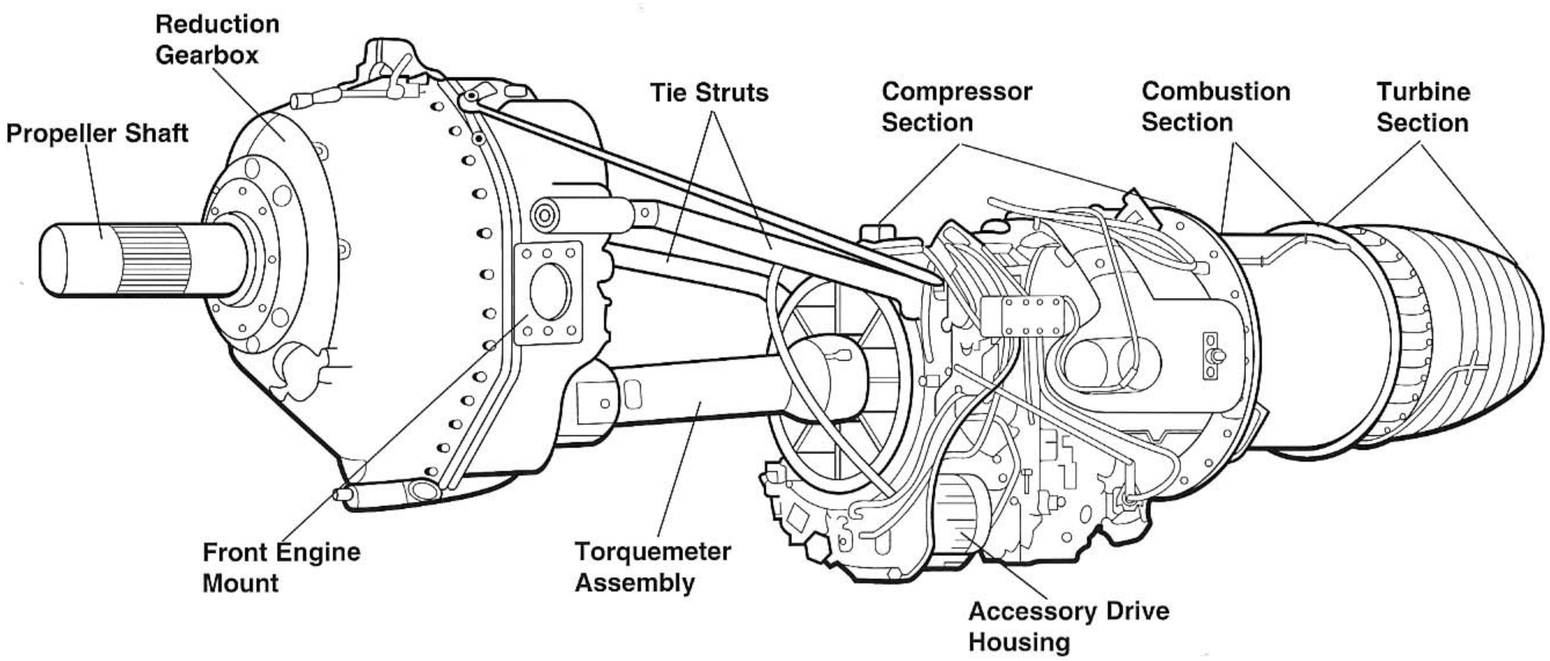


The starboard upper access panel is opened to reveal the oil tank above the T56 engine. A bracing rod keeps the door open. The engine accessory equipment gearbox is just in front of the oil tank. The vane on the inside of the oil tank access door keeps the oil tank filler cap from vibrating loose during flight. This black cap has a yellow T-shaped handle. (Ron Leonard)

C-130 Engines

Variant	Engine
C-130A	3750 SHP Allison T56-A-1A
C-130B/E	3755 SHP Allison T56-A-7
C-130H/K	4910 SHP Allison T56-A-15
C-130J	4591 SHP Rolls-Royce AE2100D3

T-56 Engine and Gearbox



The opened starboard access panel shows the T-56 engine's air intake duct. Air travels from the intake through this duct to the compressor. Mounted on the accessory pads are the engine starter, an Alternating Current (AC) generator, a hydraulic pump, an oil pump, and a generator for the propeller shaft tachometer. (Ron Leonard)

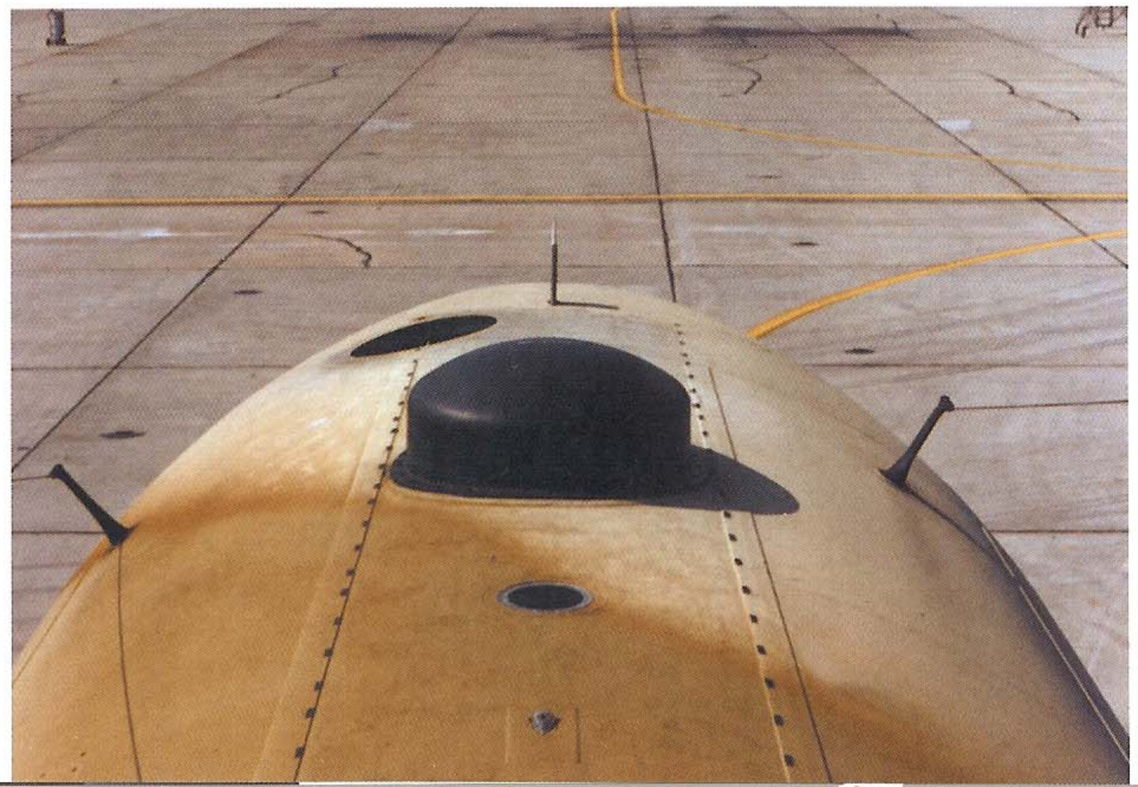
The C-130J is powered by a quartet of 4591 SHP Rolls-Royce AE2100D3 turboprop engines. This engine generates 29 percent greater thrust than the C-130E's Allison T56-A-7, while increasing fuel efficiency by 15 percent. These factors result in the C-130J having 21 percent greater speed, 50 percent reduced climb time, and 40 percent greater range than the C-130E. (John Gourley)

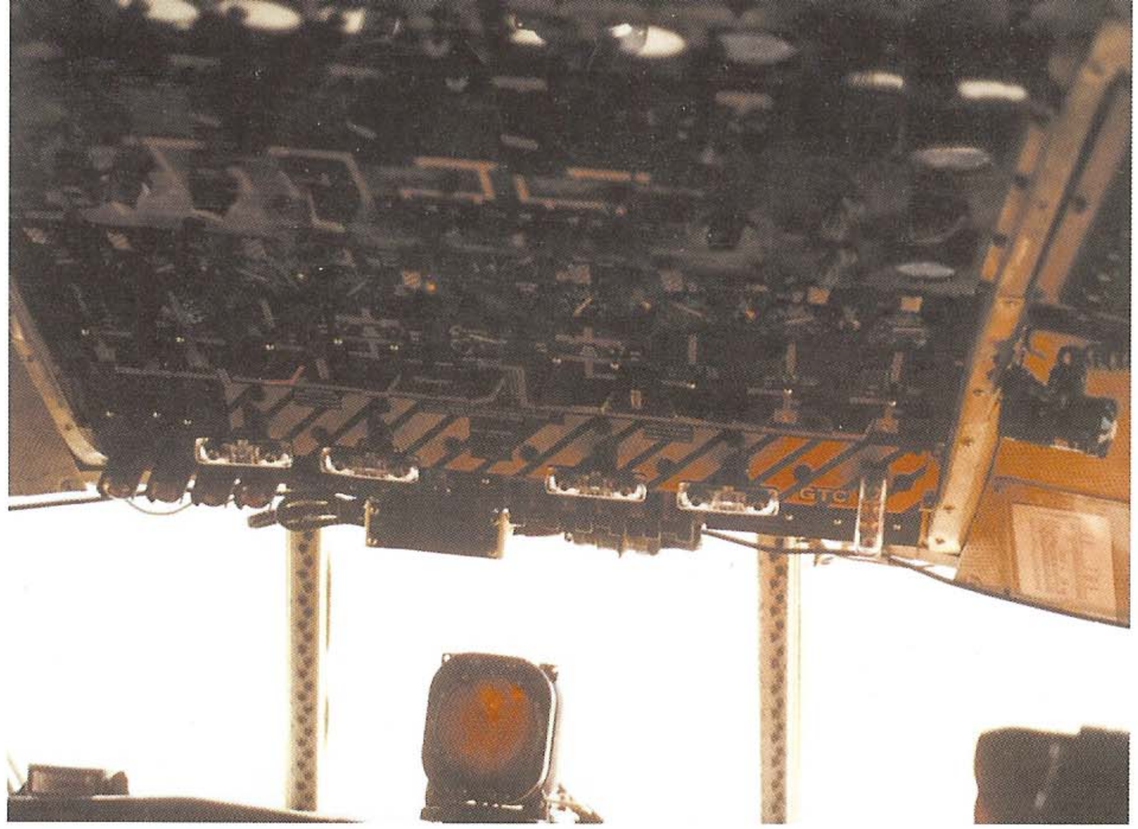
The C-130J's AE2100D3 engines turn six-bladed Dowty Aerospace R391 propellers. These composite construction propellers are lighter in weight and have fewer moving parts than the metal Hamilton Standard propellers used on earlier Hercules variants. The curved blades reduce noise while providing greater aerodynamic efficiency over the straight blades used on the older propellers. (John Gourley)

The nose profile of cargo-carrying Hercules variants has remained unchanged from late C-130A through J models. This C-130E has a AN/APN-59B navigation and moving target indicator radar mounted in the nose. The radome is hinged at the top for access to the radar. A red REMOVE BEFORE FLIGHT streamer is attached to a cover for the air data probe on the port fuselage side. (Lou Drendel)

The crew entrance door on the forward port fuselage side can be opened from inside or outside. The spring-loaded telescoping counterbalance on the door's forward edge keeps the opening rate of the free-falling door within acceptable limits. This door can also be jettisoned in an emergency. (Ron Leonard)

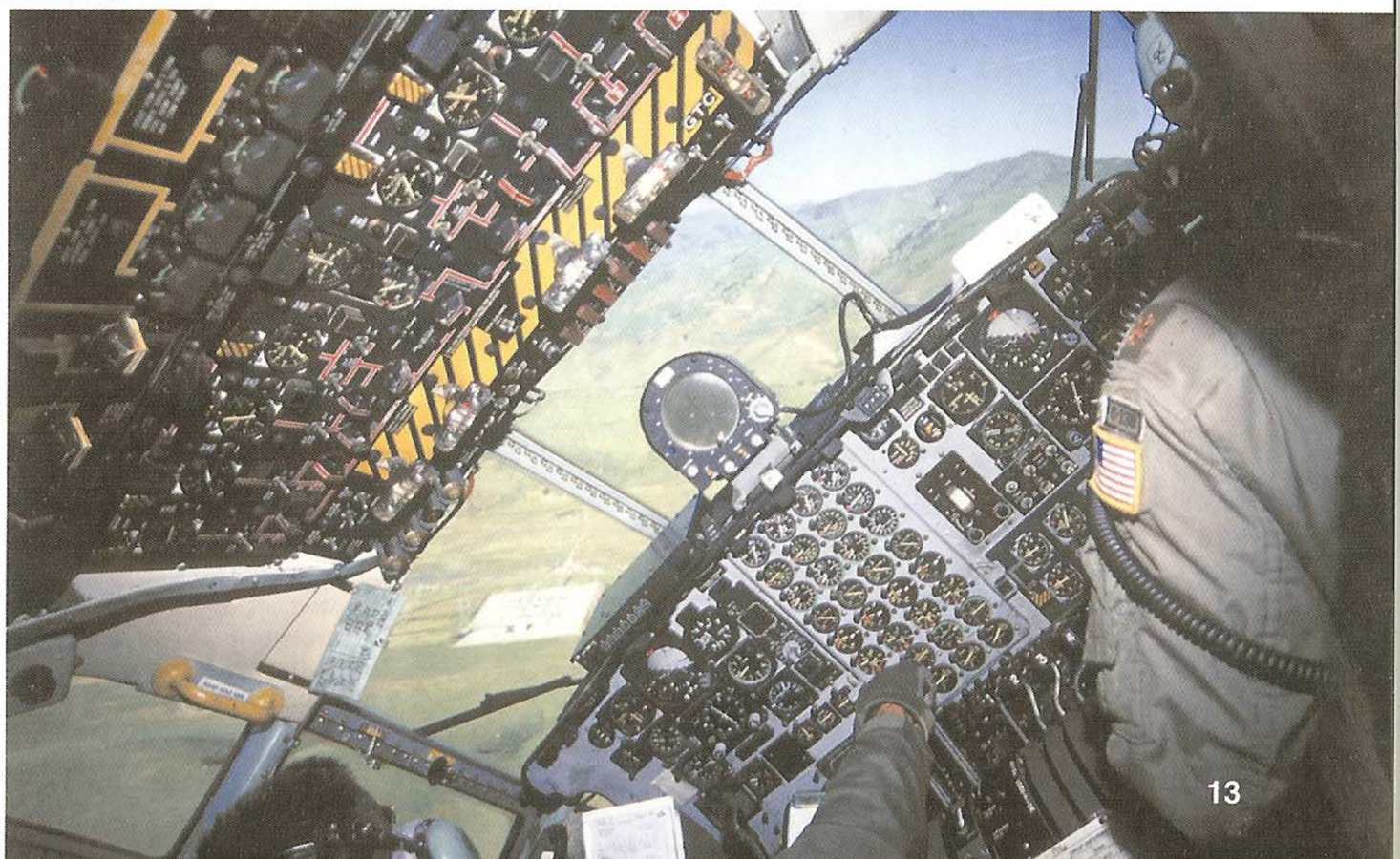
The large radome atop the fuselage houses the antenna for the Sierra Research AN/APN-169A station-keeping radar. The small flush antenna immediately aft is for the Identification Friend or Foe (IFF) transponder. The wire antenna to port is for the Liaison 1 radio channel, while the wire antenna to starboard is for Liaison 2 and for Long Range Navigation (LORAN). (Ron Leonard)



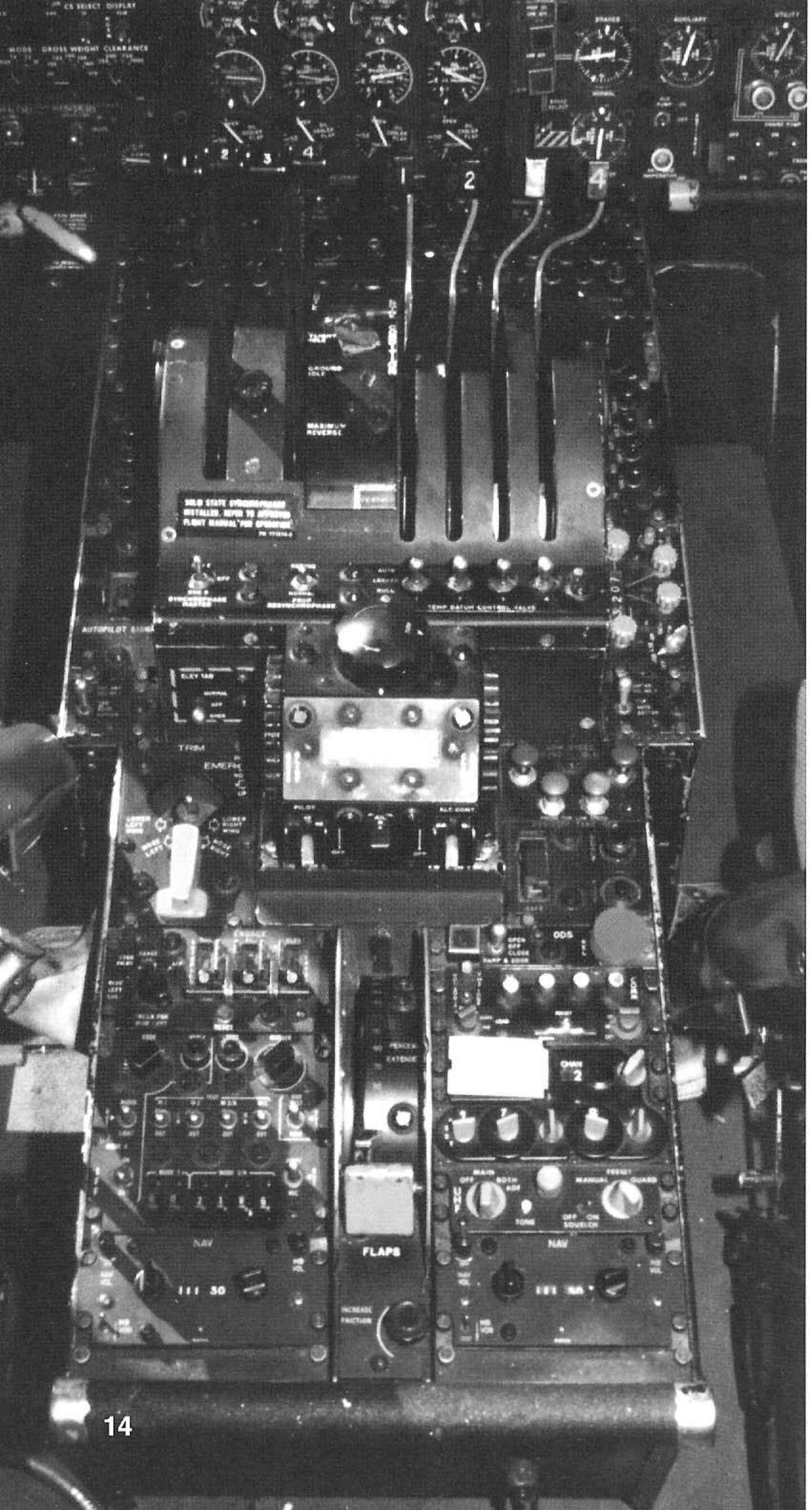


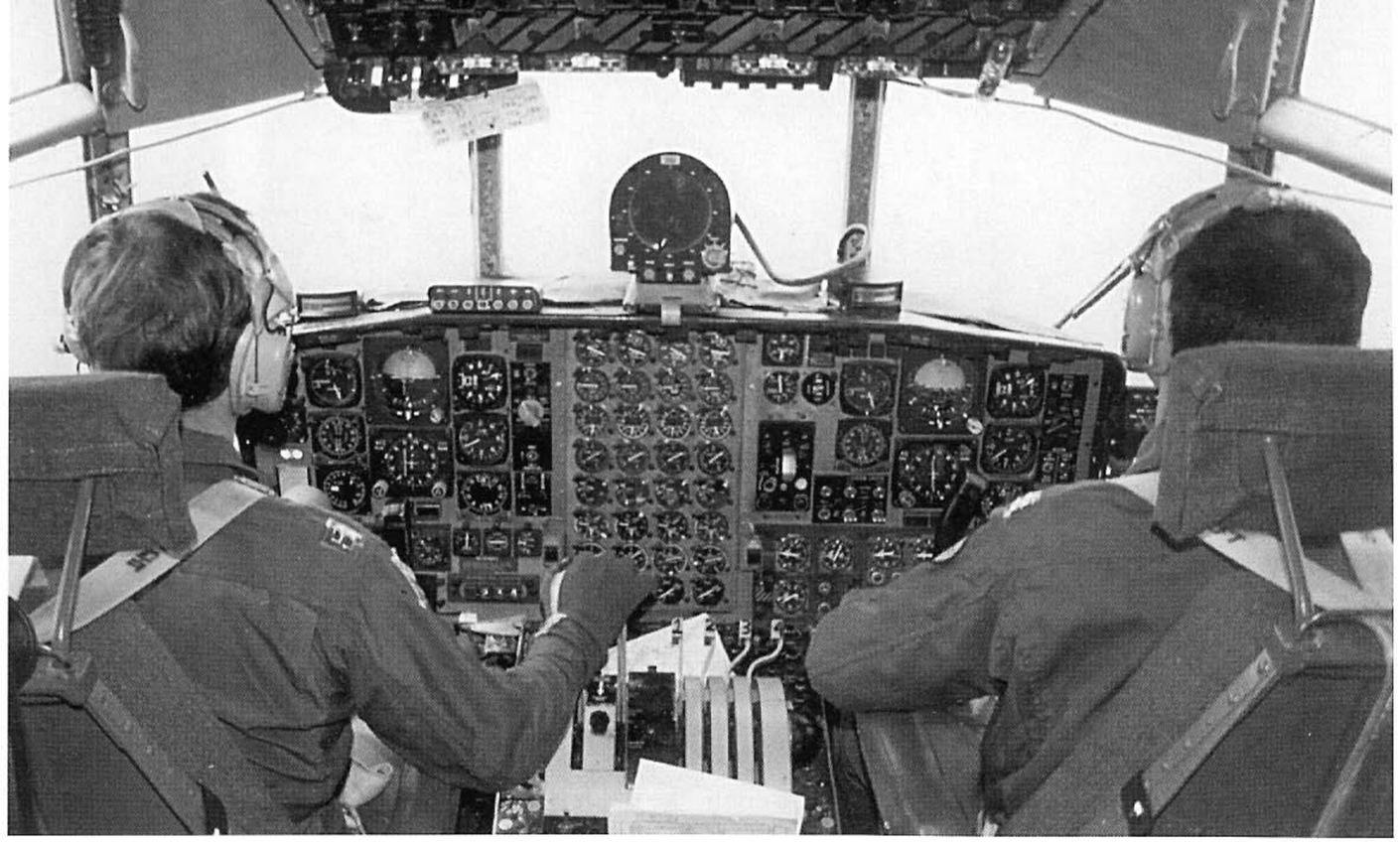
The overhead control panel on this DC-130 drone controller aircraft is typical of such panels installed on Hercules variants. The lowermost section includes (from left): engine starting controls, ice detection warning lights, control boost switches, and oil cooler flap controls. Immediately above these items are the fire warning system test switches (left) and the fire emergency controls. The next row contains fuel controls, with electrical controls farther aft.

The large display atop the C-130E instrument panel is the station-keeping radar display. Precise station-keeping is an important aspect of formation paratroop drops. Red tipped throttle levers are mounted on the port side of the center console, while yellow tipped engine condition levers are located to starboard. (Lou Drendel)



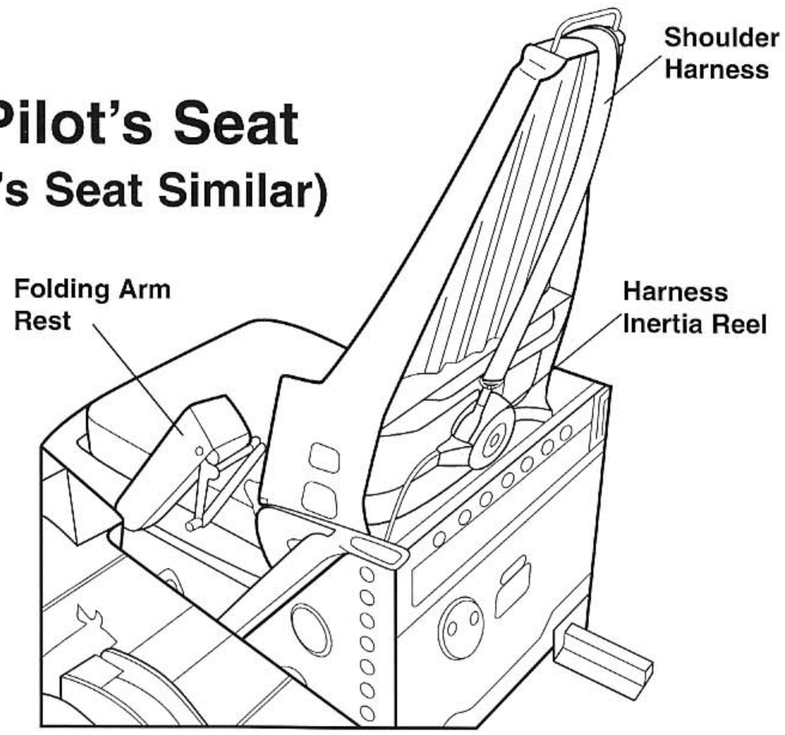
A California ANG C-130E (62-826) flies low and banked to port on 22 April 1998. The yellow/black striped panel overhead is the fire emergency control panel. Other overhead panel controls include air conditioning and pressurization, electrical, fuel, oil cooler flaps, and engine starting controls. A different radar/station-keeping display is mounted atop the instrument panel. Engine instruments – one set for each of the four engines – are located on the instrument panel's center section. Approach and landing charts are clipped to the front of the pilot's control column for easy reference. Primary C-130 flight deck colors are Dark Gull Gray (FS36231) and semigloss Instrument Black (FS27038). (Ted Carlson/Fotodynamics)





(Above) The C-130E/H instrument panel is dominated by the engine instrument displays above the center console. There are eight instruments for each engine, including (top to bottom) torquemeter, tachometer, turbine inlet temperature indicator, fuel flow gauge, oil temperature gauge, oil pressure gauge, oil quantity gauge, and oil cooler flap position indicator. Both the pilot (port) and co-pilot (starboard) wear headphones for radio and intercom receiving. Hercules crew members wear back-mounted parachutes when necessary. (Ron Leonard)

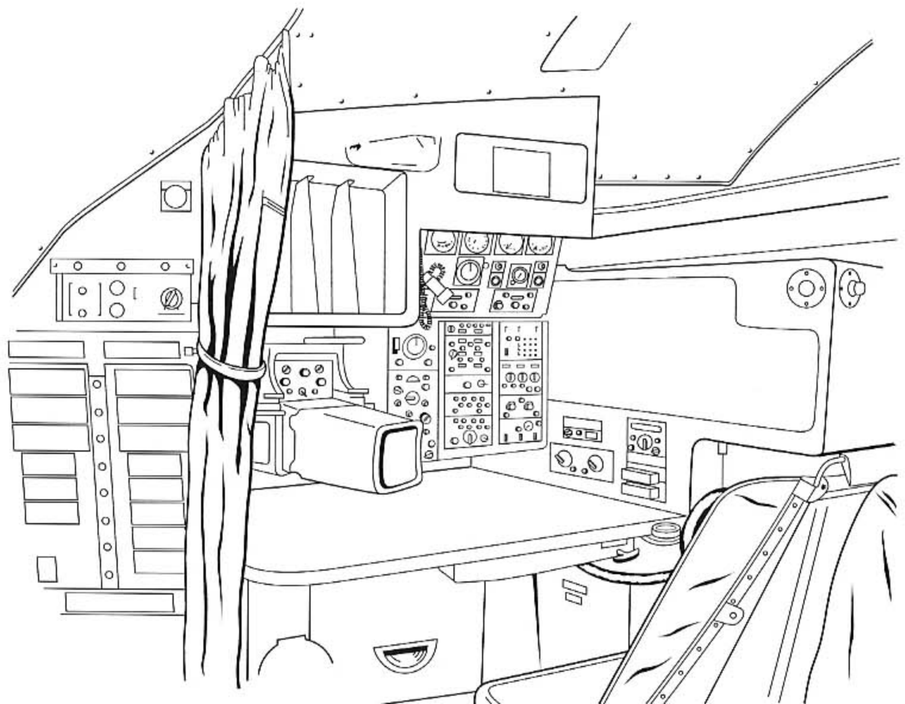
Co-Pilot's Seat
(Pilot's Seat Similar)

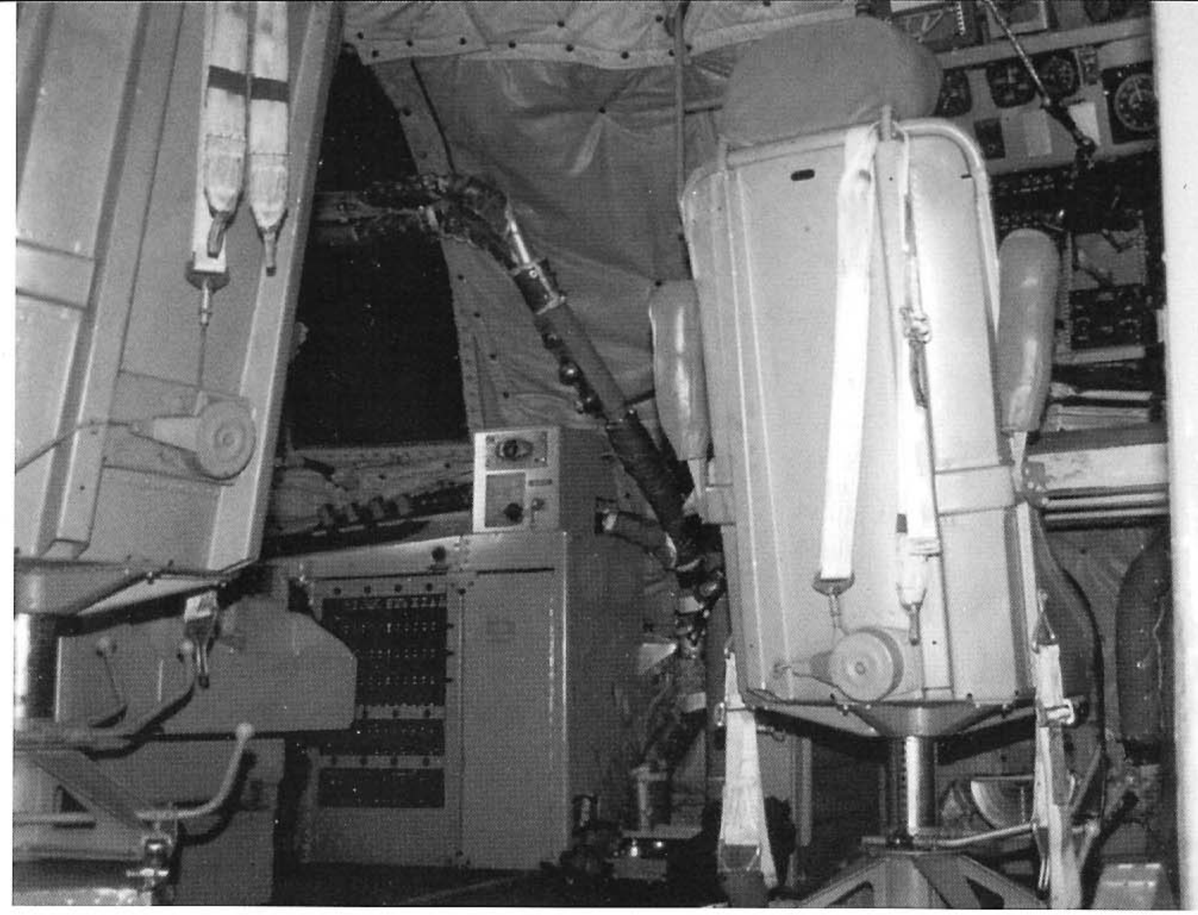


(Left) The center console of this MC-130H (64-0568) is typical of consoles found on C-130A through H aircraft. The throttles are mounted on the port forward section, with the engine condition levers alongside the throttles. Either the pilot or co-pilot can move these levers individually or collectively. The autopilot controller – dominated by a large black circular knob – is located aft of the levers, flanked by trim tab controls to port and assisted take off controls to starboard. Various navigation and communications controls are located on the console's aft section, with the flap control lever mounted in the center. (John Gourley)

A C-130 pilot assigned to the 320th Air Expeditionary Wing (AEW) guides his Hercules into a landing zone in Afghanistan during Operation ENDURING FREEDOM in late 2001. The large number of cockpit windows provides both pilots with excellent visibility toward the front, sides, and below the cockpit. This capability is greatly appreciated during flights into and out of unimproved airfields. (USAF Photo by SSgt Aaron Allmon)

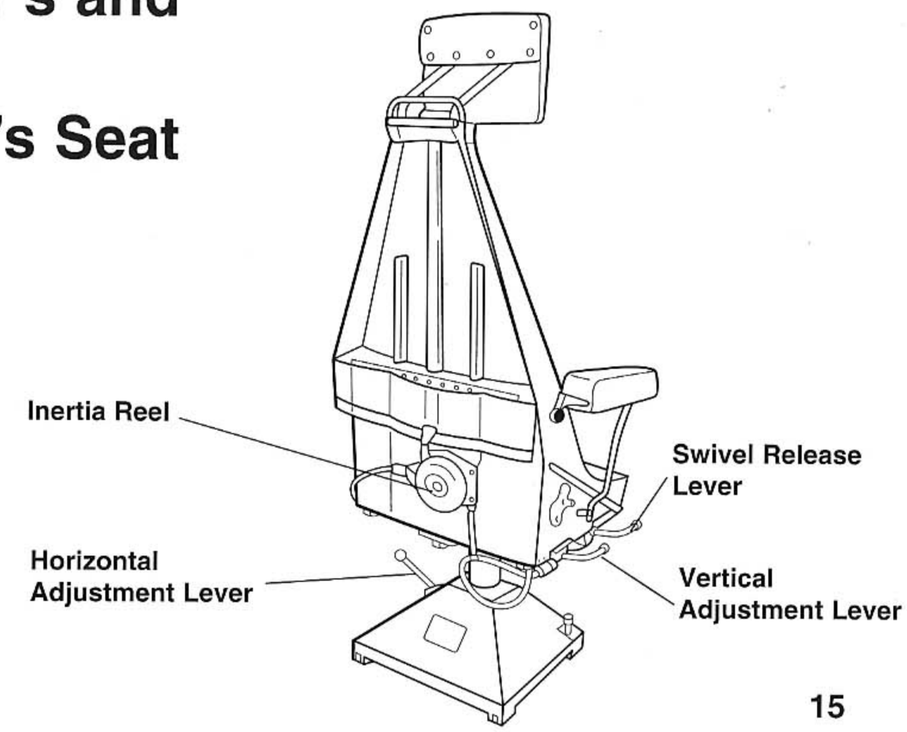
Navigator's Station (Typical)

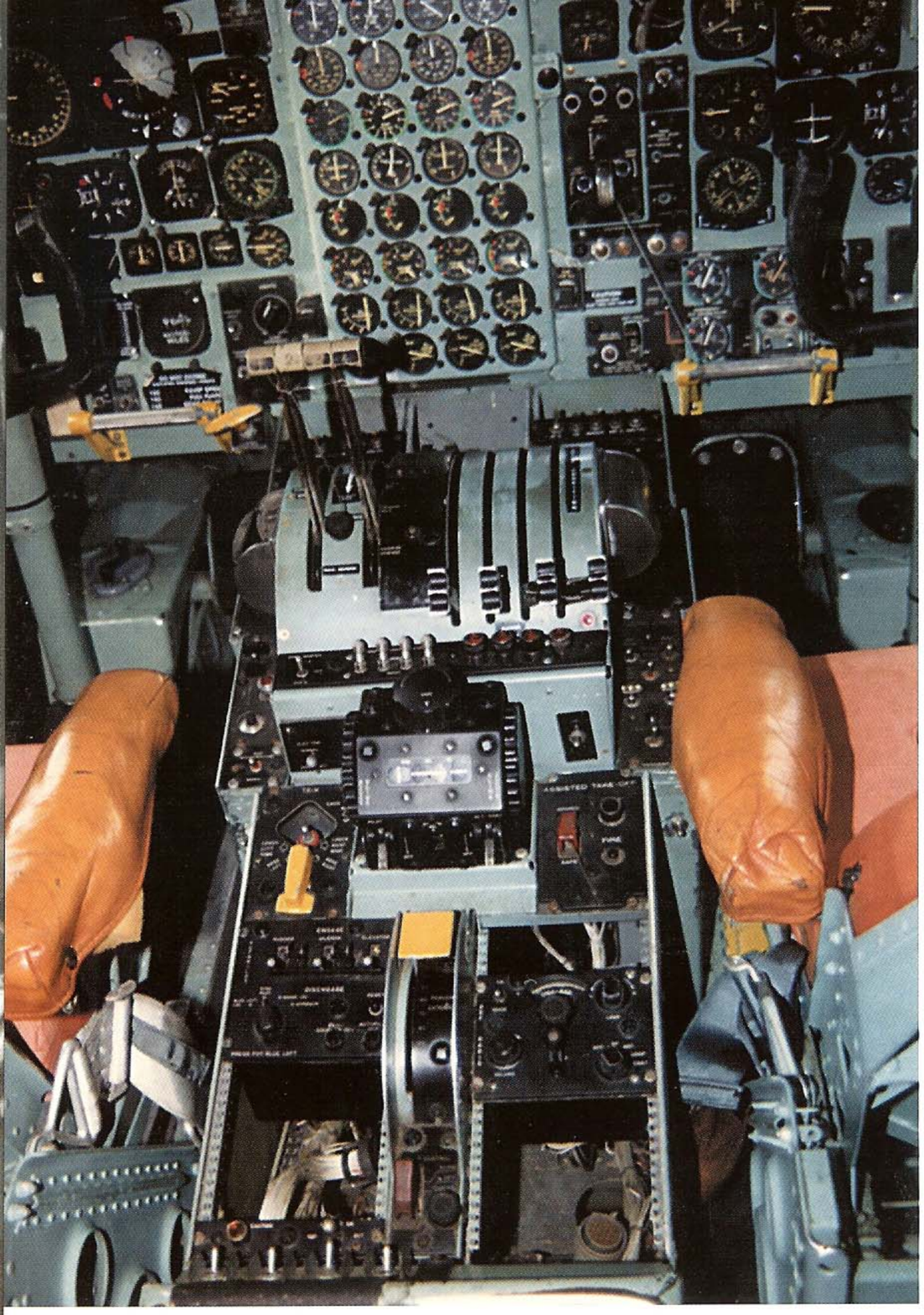




The C-130H navigator sits aft of the co-pilot. This is a different model seat than those fitted to many Hercules aircraft for the navigator and flight engineer stations. He has a table for reading maps and charts while also observing navigation and flight data instruments on the panel opposite his seat. The rear of his seat faces the flight deck corridor. The seat to port is used by the flight engineer, who monitors aircraft systems for the two pilots.

Navigator's and Flight Engineer's Seat





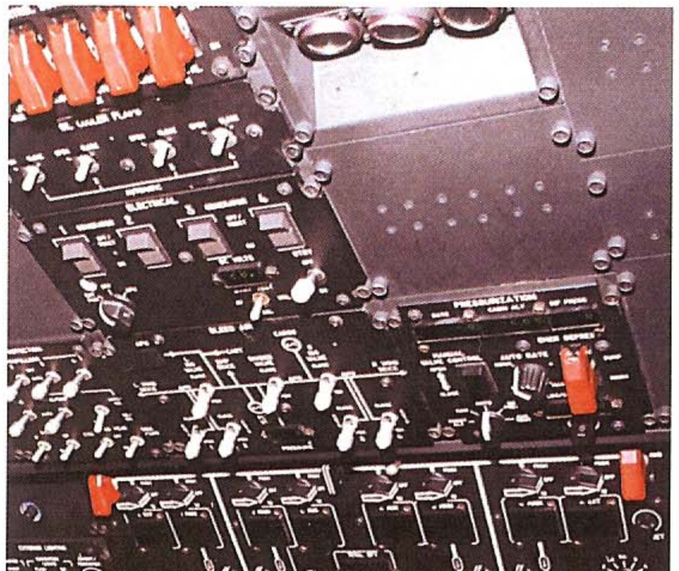
Several panels have been removed from the center console of this early C-130B, exposing wiring inside the console. The light blue and black attitude indicator is mounted on the upper section of the pilot's instrument panel. Immediately to port of this instrument is the large Radio Magnetic Indicator (RMI). This navigation instrument compares the aircraft's bearing with a tuned radio beacon's magnetic bearing. (Damon Blair)

A C-130J (97-1354) is parked at Glenn L. Martin State Airport in Baltimore, Maryland in August of 2000. It is assigned to the 135th AS, 175th Wg, Maryland ANG at this airfield. This Squadron is the first ANG unit to fly the latest Hercules transport variant, which replaced C-130Es. (Maryland ANG)

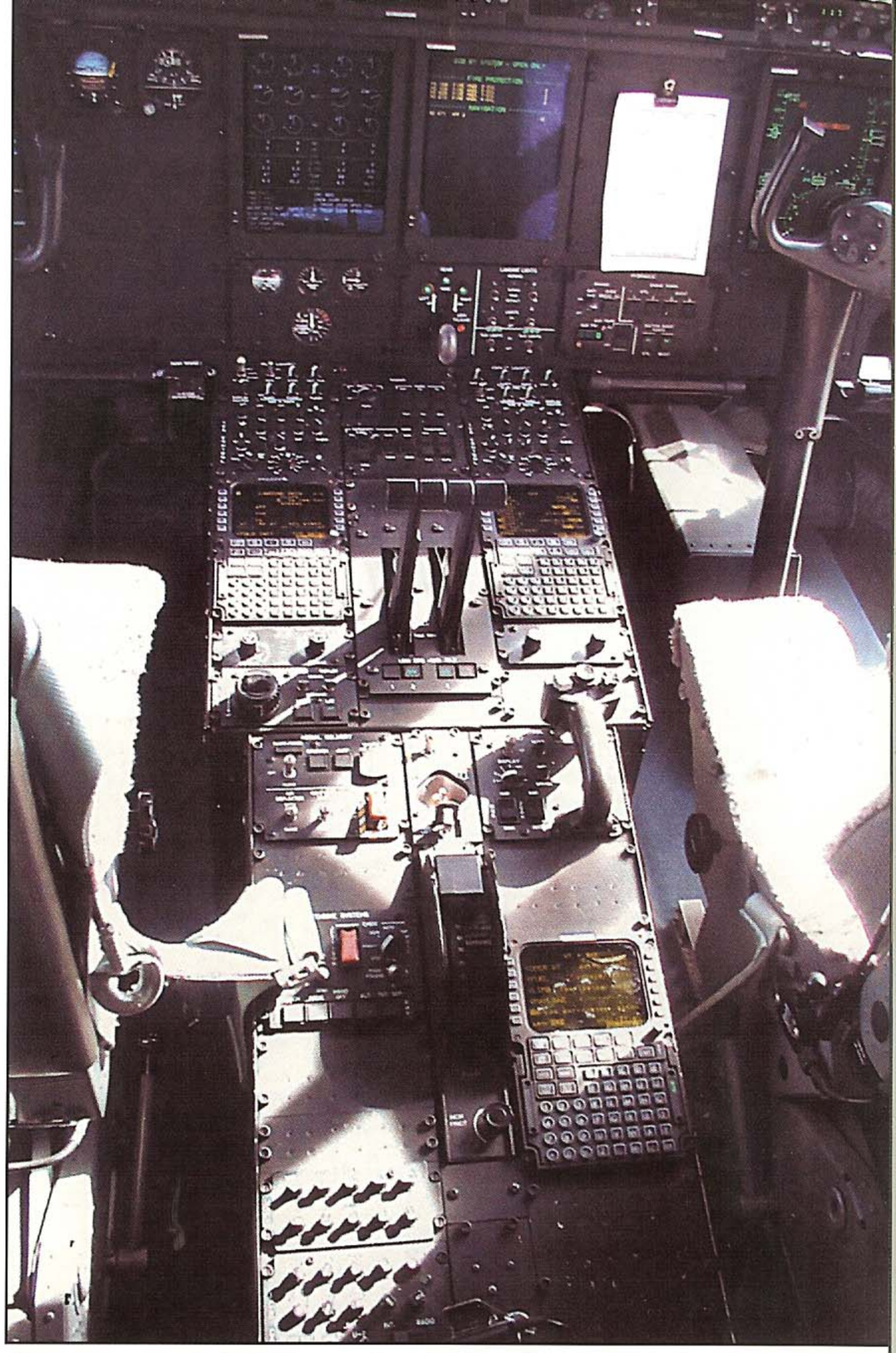
The C-130J instrument panel incorporates Multifunction Displays (MFDs) in front of both pilots. These display a wide variety of information, which the pilots select using buttons surrounding the MFD. Engine readings are displayed on one of two large MFDs located above the center console. Backup analog instruments are limited to attitude and heading information. (Lou Drendel)

Instrument panel displays are fully powered up on this C-130J. The four large MFDs on the instrument panel are in color, while the others are monochromatic. These displays are easier to read than the earlier analog instruments. This 'glass cockpit' is one of the C-130J's major changes from earlier Hercules aircraft. Automated cockpit functions resulted in the elimination of both the navigator and flight engineer from this variant. C-130Js retain the loadmaster stationed in the cargo hold from earlier Hercules transport variants. (John Gourley)

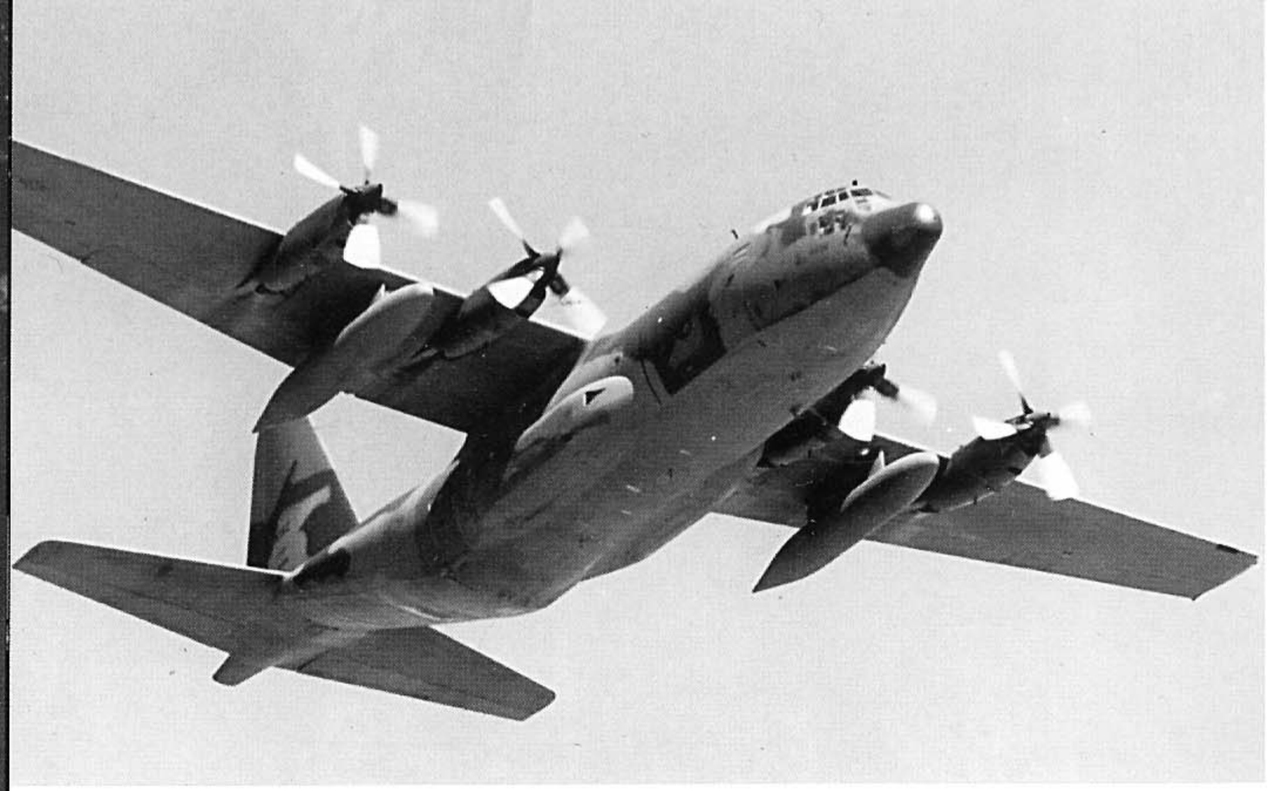
The C-130J overhead console has fewer switches than earlier Hercules variants. White and yellow fire emergency controls are located along the forward edge, near the canopy. Further aft are controls for the fuel, electrical, and environmental systems. Red safety covers are mounted over several sensitive switches. (John Gourley)



A large moving map is displayed on the MFD to starboard of the engine instrument MFD. This map moves on the screen while the aircraft's position is fixed on it. Global Positioning System (GPS) and Inertial Navigation System (INS) information is also displayed on this map. (John Gourley)

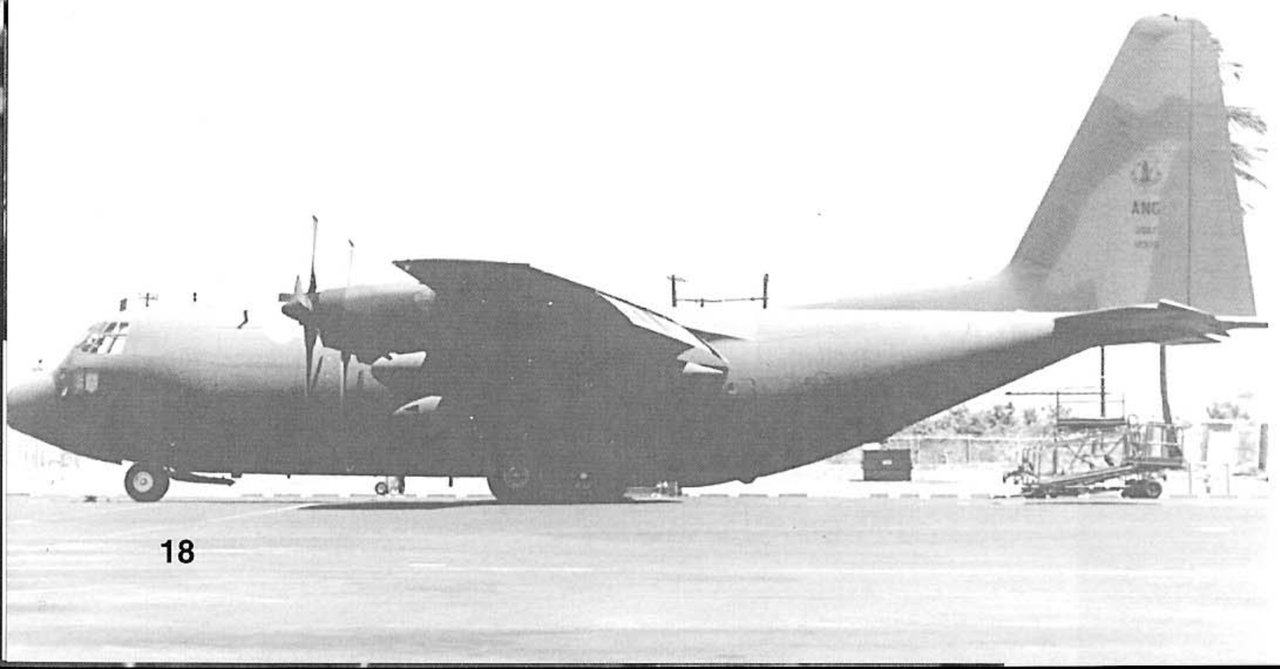


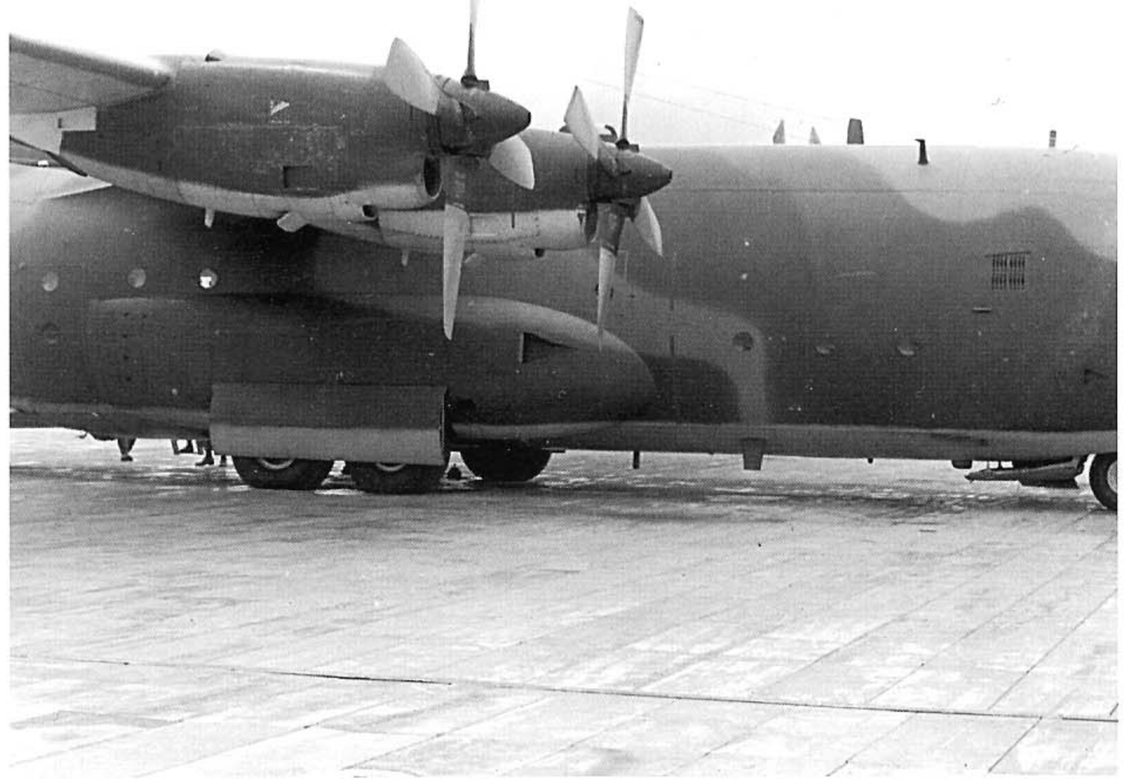
Computer-controlled displays replaced the earlier engine condition levers on the C-130J's central console. This leaves the four throttle levers as the only such devices on this console. Keypads immediately aft of the MFDs allow either pilot to call up pertinent data on the screen. The landing gear actuation lever is mounted below the starboard MFD. (John Gourley)



A C-130 assigned to an unknown USAF unit gets airborne in 1987. The landing gear and flaps are fully retracted for normal flight. Main landing gears are housed in large streamlined sponsons along the lower fuselage sides. These fairings allow for an unobstructed cargo floor while offering stable ground handling. (Tom Garcia)

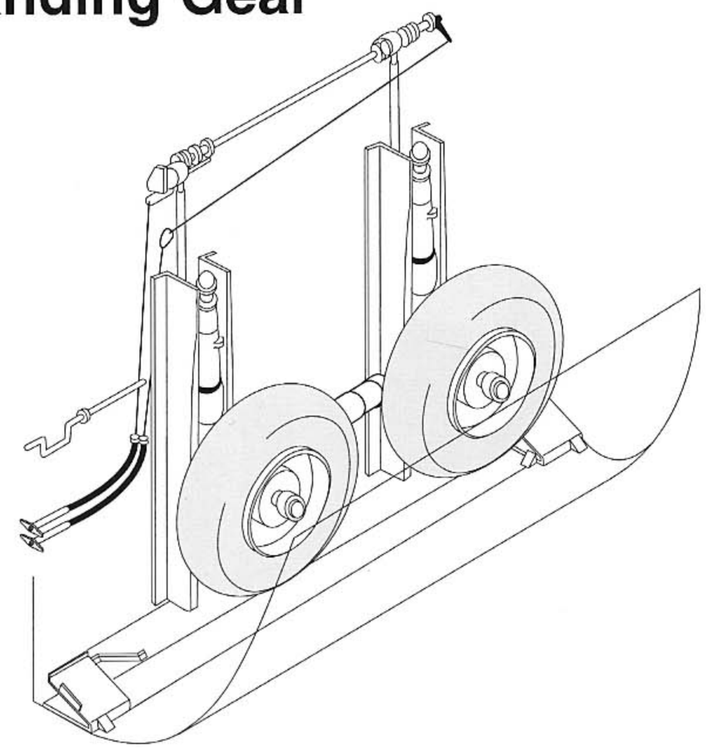
A C-130 assigned to an unknown ANG unit is parked at an airfield in 1984. The outer main landing gear doors are raised on this Hercules. This was usually performed during maintenance to provide improved access to the gear assembly. The outer doors were usually lowered when the gear was extended. This lowered door position reduced foreign object ingestion into the gear bay.





This C-130 is parked at an airfield in Southeast Asia during the Vietnam War. Hercules main landing gears extend vertically from their wells. A single large outer door covers most of the gear and is complemented by a smaller inner door (hidden from this view). The triangular Gas Turbine Compressor (GTC) intake is faired within the forward sponson. A GTC serves as the Hercules' Auxiliary Power Unit (APU) for ground operations. (William P. White)

Main Landing Gear

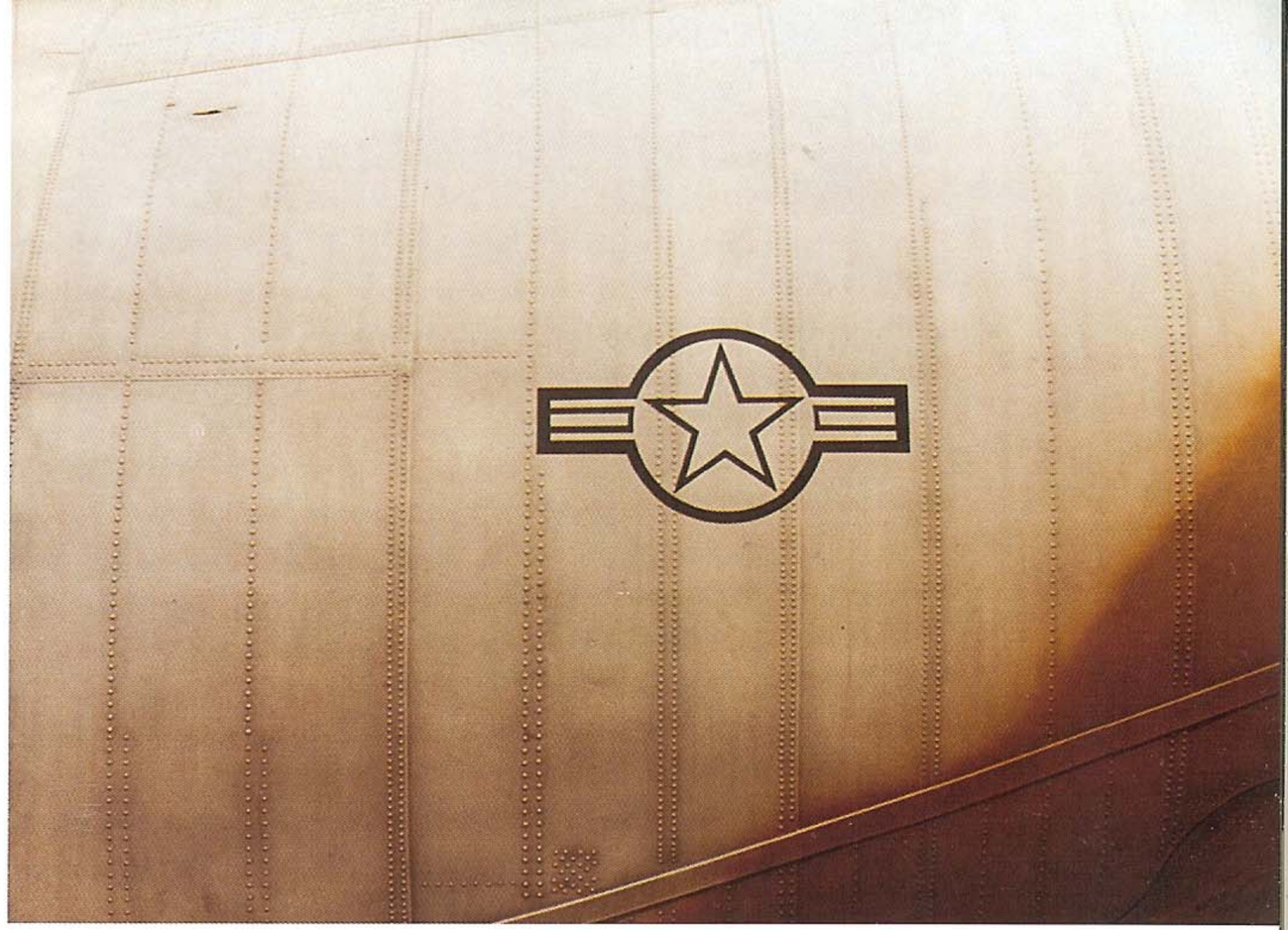


A British Royal Air Force (RAF) Hercules C.Mk.1 (XV218) warms up its engines at a snow-covered airfield. The Hercules C.Mk.1 was designated the C-130K in the US and was similar to the C-130H, except for the installation of British equipment for communications, navigation, and cargo handling. Lockheed delivered 66 C-130Ks to Britain beginning in 1967 and many of these remain in service. This aircraft is painted in the RAF camouflage scheme of Dark Green (FS34079) and Dark Sea Grey (FS36173) upper surfaces, with Light Aircraft Grey (FS36440) undersurfaces. Britain's Hercules fleet is based at RAF Lyneham, England. (British Ministry of Defense)

(Above Left) A C-130E (70-1268) rests between missions at a USAF Military Airlift Command (MAC) base. This Hercules is camouflaged in the Southeast Asia (SEA) camouflage scheme adopted in the mid-1960s. This scheme consists of upper surfaces in Dark Green (FS34079), Medium Green (FS34102), and Tan (FS30219), while undersurfaces are Light Gray (FS36622). The scalloped demarcation between upper and lower camouflage colors is unusual for the C-130 fleet. The crew access door is opened and an electrical power cable is plugged into a receptacle above the nose landing gear. On 1 June 1992, AMC acquired the airlift assets of the former MAC. (Jan E. Jose)

(Above) All C-130 variants are equipped with four flaps, consisting of outboard and inboard flaps on both the port and starboard wing undersurfaces. These flaps are Lockheed-Fowler, high lift devices, whose flap motion is a combination of aft and downward movements. The aft motion increases wing area and the downward tilting movement alters the airfoil section to increase aircraft lift and drag. The flaps are fully lowered 35° between ten and 13 seconds and fully retract in the same amount of time. (Lou Drendel)

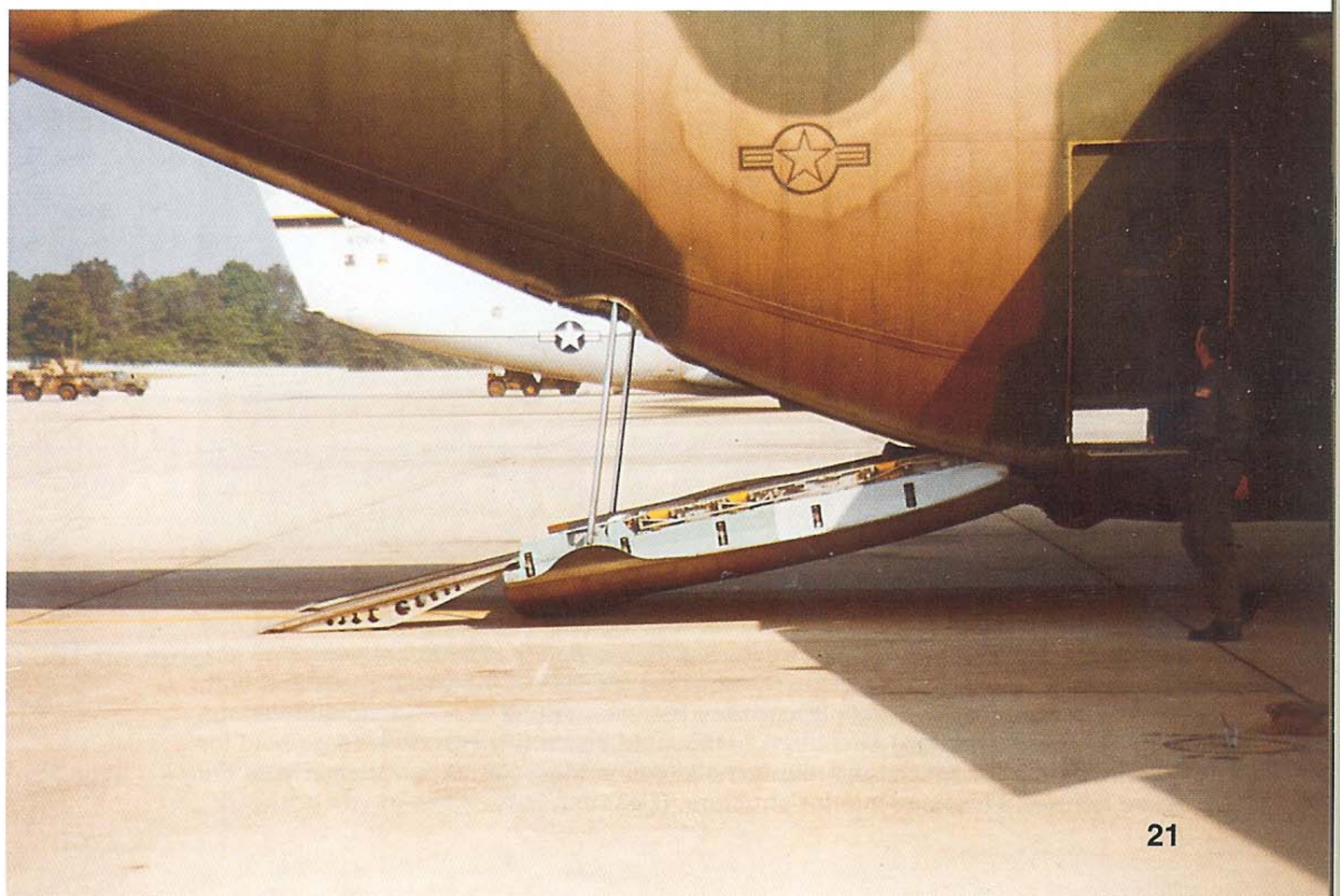
(Left) The C-130's airfoil section has remained constant throughout its production life. The wing chord (width) at the wing root is 16 feet (4.9 M). All Hercules variants have a wing area of 1745 square feet (162.1 M^2). Four fuel filler points are mounted in the wing upper surfaces, with two each to port and starboard. These allow fuel to flow into the integral wing tanks. Ailerons are fitted outboard along the wing trailing edge. (Ron Leonard)

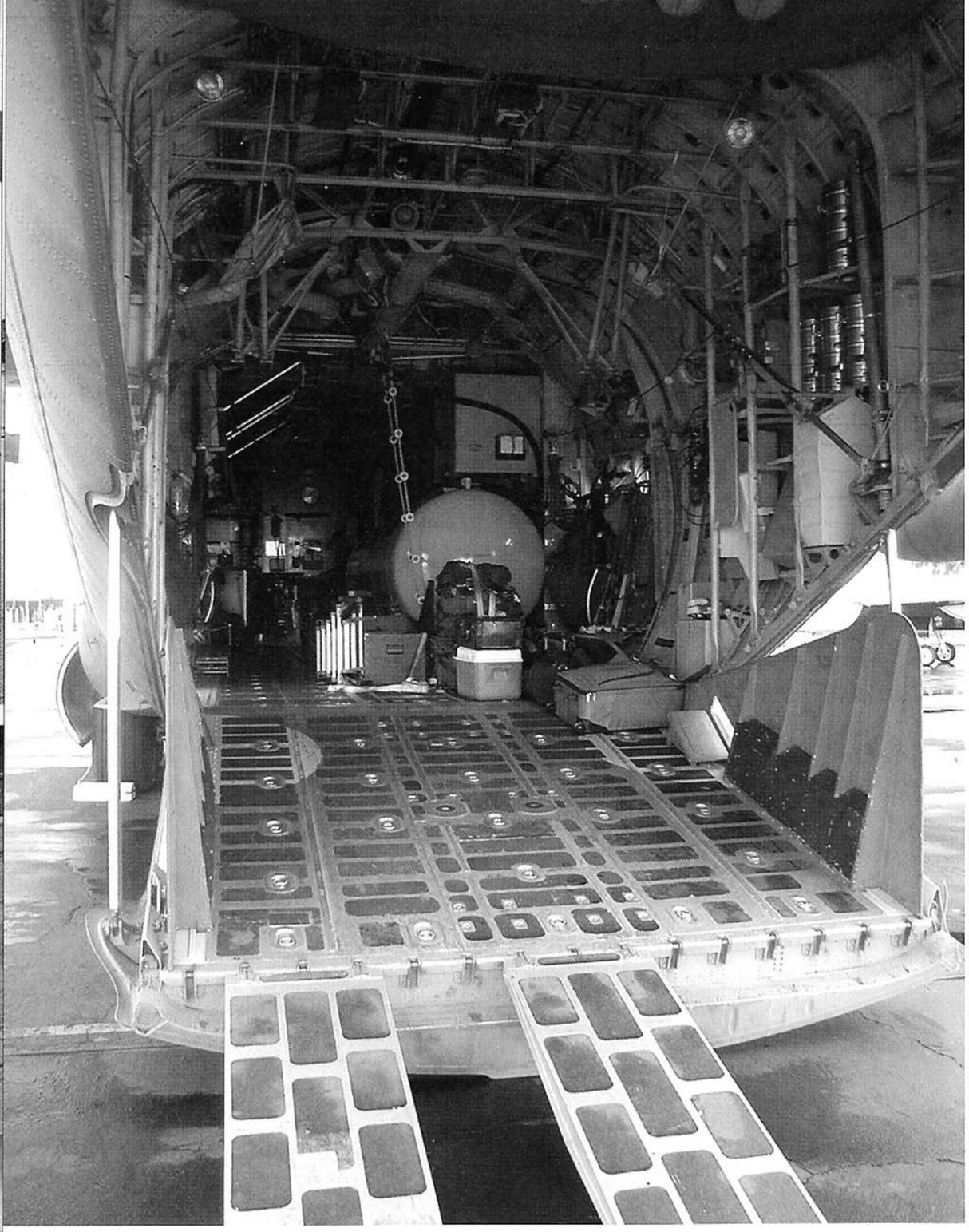


(Above) The upper aft fuselage slightly tapers toward the C-130's aft end. The horizontal tail surfaces are mounted to the upper aft fuselage and consist of a horizontal stabilizer and an elevator. The horizontal tail span measures 52 feet 8 inches (16.1 M). The vertical stabilizer has a broad chord that tapers aft to the rudder's trailing edge. (Ron Leonard)

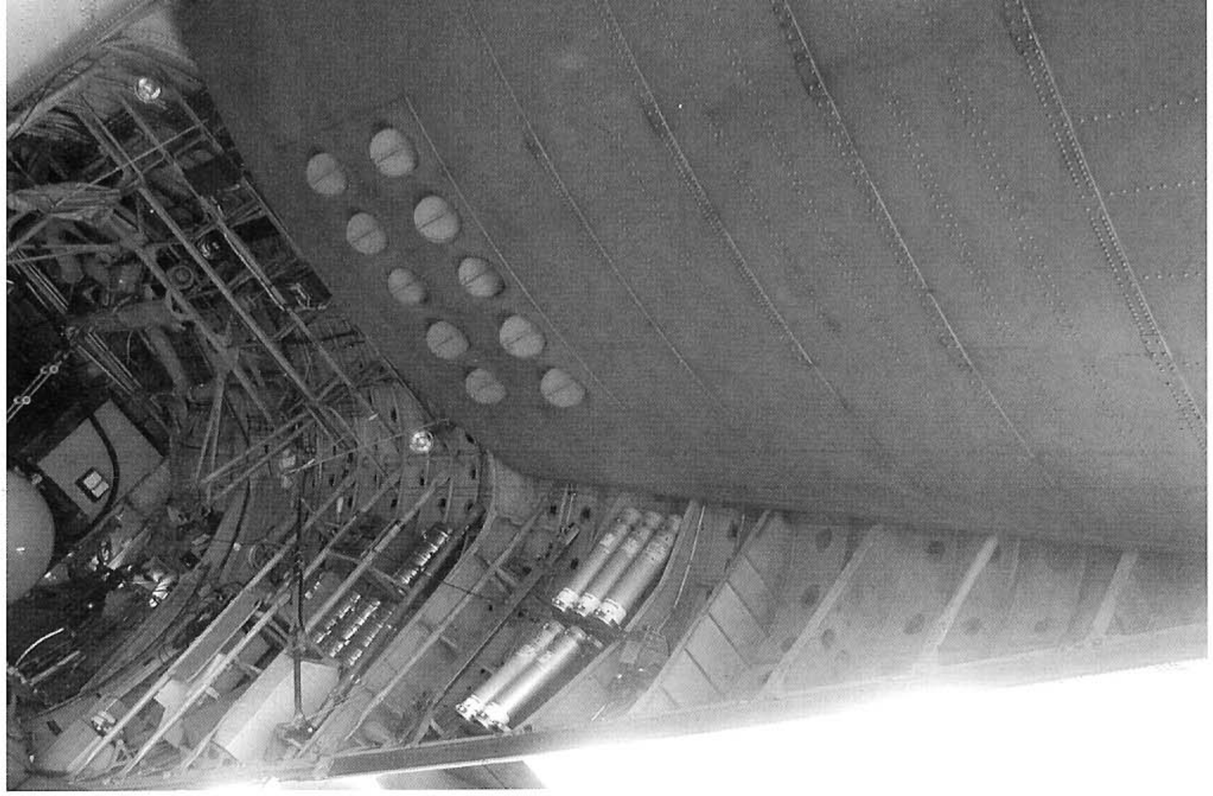
(Above Right) Rows of rivets indicate where the skin is bonded to ribs on the C-130's aft fuselage. A reinforcing strip runs along the lower fuselage side. The Hercules' robust structure has stood it in great stead throughout its multitude of roles and operating environments. This desert camouflaged USAF C-130 has a black outline US national insignia, in place of the full-color (red, white, and blue) emblem. Such monochromatic insignias are common on US Hercules involved in tactical transport and special operations roles. (Ron Leonard)

(Right) The aft cargo ramp provides entry for wheeled vehicles and large loads and is also used for aerial delivery system operations. Two vehicle ramps are extended from the ramp's aft edge to the ground. A pair of hydraulic actuators help raise and lower the ramp. This ramp fully seals the fuselage when closed, allowing for a fully pressurized cargo hold. The hydraulically-operated door and ramp are operated either by the loadmaster, using the control panel just aft of the paratroop door, or from the cockpit using the air drop system control panel on the flight pedestal. An airman stands near the starboard paratroop door, which accompanies an identical door to port. Paratroops exit the C-130 through either of the doors. (Lou Drendel)

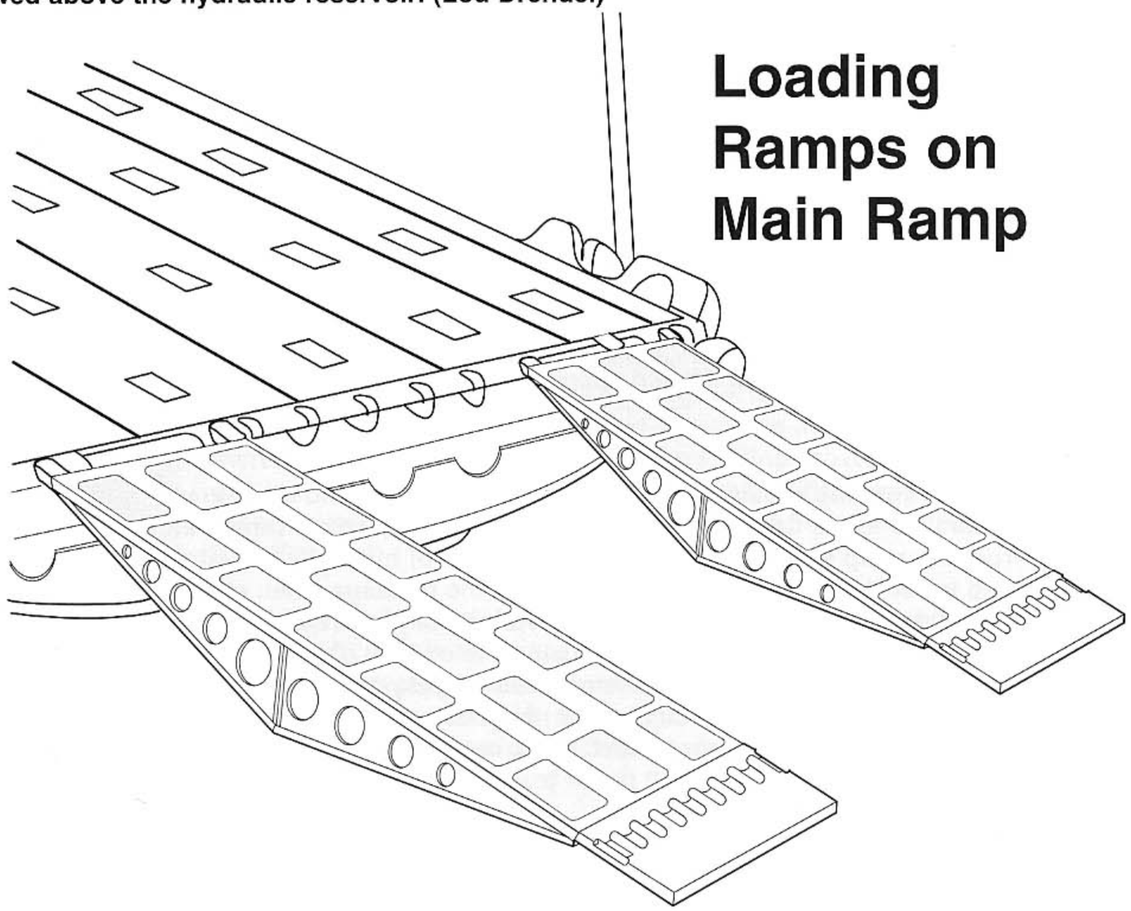


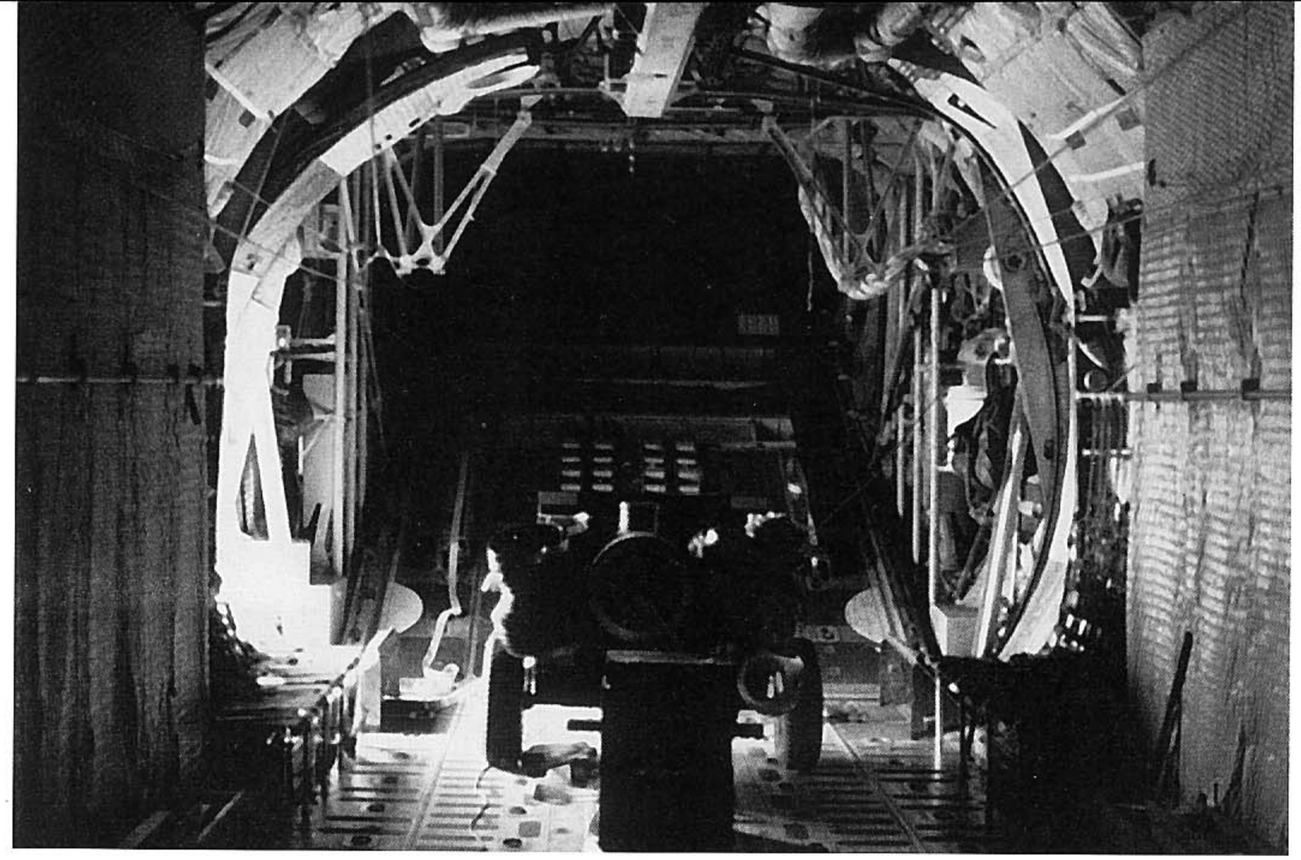


The aft cargo ramp opens downward for loading and unloading of equipment and personnel. It is a load-carrying structure, with a capacity of 5000 pounds (2268 KG). Rectangular patches of non-skid material are placed on the cargo ramp and both vehicle ramps. These vehicle ramps may be repositioned to accommodate various vehicles and equipment. A fuel tank is mounted inside this HC-130's cargo hold for aerial refueling of special operations helicopters. Most Hercules variants have the same ramp and fuselage interior structure. (Lou Drendel)



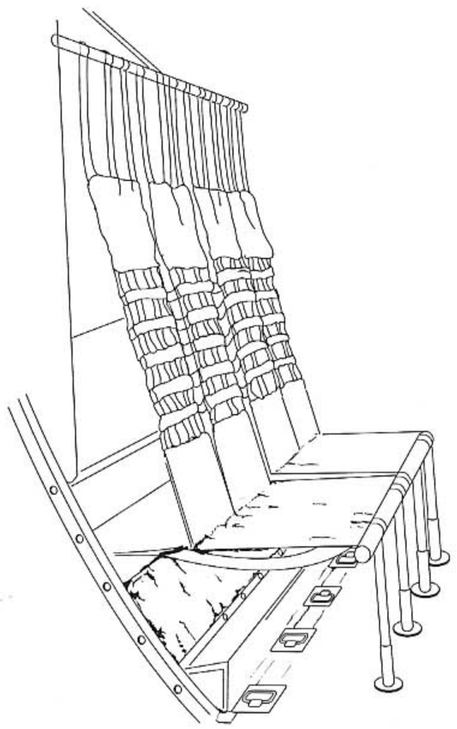
The upper rear cargo door section opens into the aft fuselage when the cargo ramp opens. These two surfaces close in unison, allowing for full pressurization of the fuselage. An auxiliary hydraulic fluid reservoir is the large cylindrical object along the cargo hold side, near the ramp actuator. Another such reservoir is mounted on the port side. Thin water bottles for troops are stowed above the hydraulic reservoir. (Lou Drendel)





A 1/4 ton (226.8 KG) Ford M151 Military Utility Tactical Truck (MUTT) is loaded in a C-130's cargo hold. The cargo ramp and door is closed immediately behind the vehicle, while the starboard paratroop door is opened. The M151 and other vehicles are loaded rearwards to ease driving off once the Hercules has landed. (Michael Kalbfleisch)

Troop Seats



C-130 Cargo Hold Capabilities

Ground Troops	92
Paratroops	64
Medical Litters (with Two Attendants)	74
463L Pallets	5

[Each pallet measures 88 inches (223.5 CM) by 108 inches (274.3 CM) and has a maximum capacity of 7500 pounds (3402 KG).]

Container Delivery System (CDS) Bundles 15

[Each CDS bundle weighs between 501 pounds (227.3 KG) and 2200 pounds (997.9 KG).]

Maximum Payload (C-130H)
42,673 pounds (19,356.5 KG)

Paratroops from the US Army's 82nd Airborne Division exit a C-130E. The Hercules' paratroop doors are raised open, leaving a fold down step for the soldiers to stand on during egress. An aerodynamic shield opens immediately in front of the door to reduce air blast. The jumpmaster (right of photo) manages the static lines to ensure that they do not get tangled, while the loadmaster stands by to assist. (Lou Drendel)

A light truck is dropped off the cargo ramp of a Royal Australian Air Force (RAAF) C-130. The vehicle is secured to a pallet with straps, while cushioning material softens the impact on the vehicle upon landing. The pallet is pushed out of the cargo hold using rollers mounted on the cargo hold floor. A parachute pulls the pallet out of the Hercules, while larger parachutes slow the vehicle's descent to the ground. (Australian Ministry of Defense)

The WC-130's loadmaster reclines on the ramp during an evening taxi. Cargo door ramp system operation is either hydraulic or manual. Hydraulic pressure is supplied through the auxiliary hydraulic system, but can also be supplied via hand pump in an emergency. Ramp operation is restricted to airspeeds below 150 knots (172.7 MPH/278 KMH). (USAF)

Both the cargo ramp and door are closed on this C-130. Standard Hercules variants have a cargo area 41 feet (12.5 M) long, while the 'stretched' C-130H-30 increases this to 55 feet (16.8 M). This area is nine feet (2.7 M) high and ten feet (3 M) wide. White insulation material covers the ceiling and walls in the Hercules' cargo hold. (Damon Blair)

(Above) The USAF developed the Low Altitude Parachute Extraction System (LAPES) during the siege of Khe Sanh, South Vietnam in 1968. North Vietnamese Army (NVA) units surrounding this US Marine base in South Vietnam's central highlands bombarded the runway and ramp. This made landing and unloading of cargo in the traditional manner a highly dangerous proposition. LAPES enabled C-130s to deliver supplies without landing. The technique was improved to allow for delivery of light armored vehicles, as demonstrated by this delivery of an M551 Sheridan by a C-130H of the 463rd Tactical Airlift Wing (TAW), Dyess AFB, Texas. This occurred during Operation BRAVE SHIELD XV at Hurlburt Field, Florida in October of 1976. (USAF via Ron Leonard)

(Right) A C-130 of *Tsvah Haganah le Israel/Hevl Ha' Avir* (Israel Defense Force/Air Force; IDF/AF) makes a LAPES delivery of supplies to a forward airfield somewhere in Israeli territory. The IDF/AF received its first C-130s in 1973 and has used them in a variety of missions. The most famous Israeli Hercules mission was the rescue of Israeli and Jewish hostages held by Palestinian terrorists at Entebbe, Uganda in July of 1976. This raid (Operation THUNDERBOLT) was conducted using four C-130s of 131 Squadron at Lod. (IDF/AF via Guy Spiegelstein)

In July of 1989, this KC-130R (QB-018/BuNo. 160018) visited Naval Air Station (NAS) Atlanta, Georgia. The Hercules was assigned to Marine Aerial Refueler/Transport Squadron Three Five Two (VMGR-352) 'Raiders' from Marine Corps Air Station (MCAS) El Toro, California. In-flight refueling pods are mounted on the outboard wing undersurfaces. (Frank Mirande)

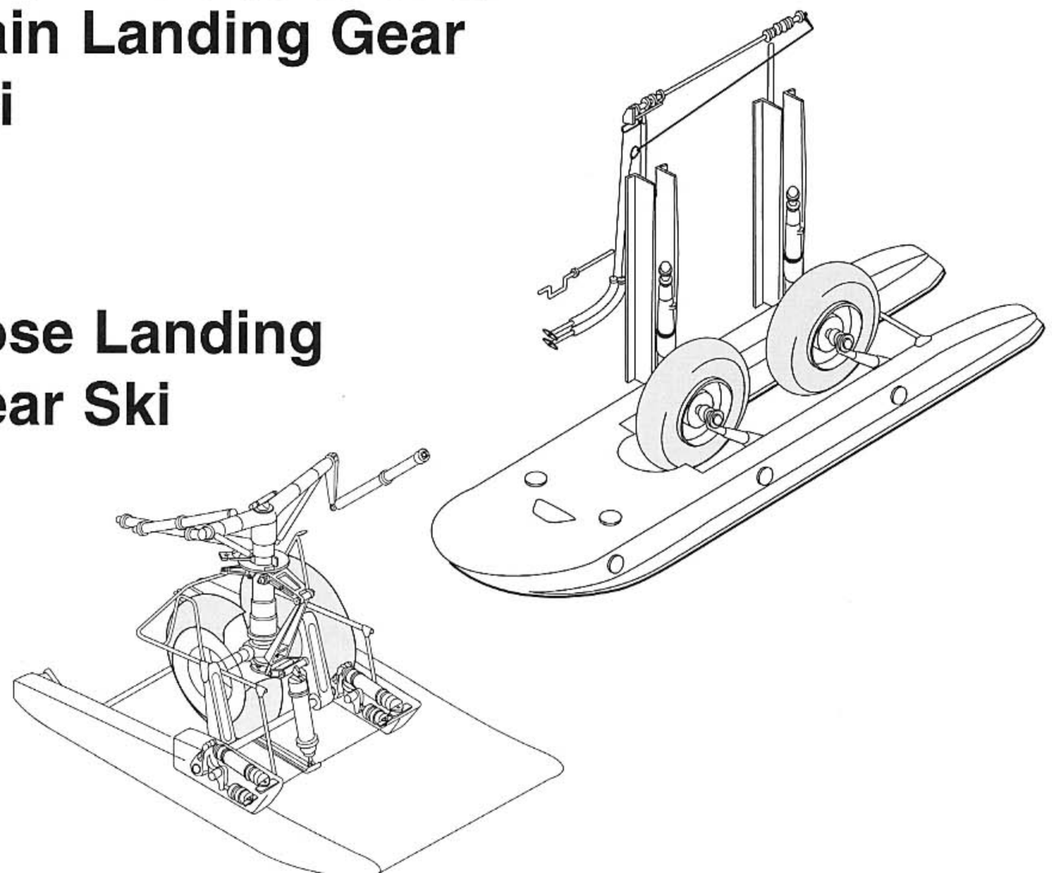
A VMGR-252 'Heavy Haulers' KC-130F (BH-896/BuNo. 148896) lands at Tinker AFB, Oklahoma in May of 1978. This Marine unit is based at MCAS Cherry Point, North Carolina. Navy and Marine C-130s were originally designated GV-1s before the tri-service designation system was adopted in the fall of 1962. This Hercules was painted Glossy White (FS17875) over glossy Light Gull Gray (FS16440). (Jack Keefer)

The name Dixie Belle is painted over the crew door of this C-130T (CW-762/BuNo. 164762) parked at NAS Atlanta in June of 1991. This Hercules was assigned to Fleet Logistic Support Squadron Fifty Four (VR-54) 'Revelers,' a Naval Air Reserve unit based at NAS New Orleans, Louisiana. The aircraft is painted in a Tactical Paint Scheme (TPS) developed for Navy and Marine C-130s. Upper surfaces were painted Blue Gray (FS35237), sides in Dark Ghost Gray (FS36320), and undersurfaces in Light Ghost Gray (FS36375). Low-visibility markings were painted in either Blue Gray or Dark Ghost Gray. (Frank Mirande)

A ski-equipped C-130D (57-0493) is displayed at Royal Air Force (RAF) Greenham Common, England in the late 1970s or early 1980s. This Hercules was assigned to the 139th TAS, 109th TAW, New York ANG at Schenectady County Airport. It was employed on supply flights to Distant Early Warning (DEW) Line radar stations in Greenland, which were covered in snow and ice. Four Jet Assisted Take Off (JATO) bottles are mounted on the aft sponson section. (Gerhard Weinman)

Main Landing Gear Ski

Nose Landing Gear Ski



City of Christchurch, N.Z. is the name of this LC-130H (83-1096) assigned to the 139th AS (formerly TAS), New York ANG. The unit deployed from Schenectady to Christchurch, New Zealand for Antarctic supply flights in 2001. This Hercules is overall ADC Gray (FS16473), with International Orange (FS12197) wingtips and tails. (John Gourley)

Another 139th AS LC-130H (83-0492) rests on the ramp at Christchurch between Antarctic missions in 2001. LC-130Hs replaced the unit's earlier C-130Ds in 1985. The Hercules flew in Operation DEEP FREEZE 2001, a joint US and New Zealand operation in support of the US National Science Foundation's Antarctic Program. (USAF Photo by MSgt Joe Cupido)

(Above) An LC-130R (XD-02/BuNo. 160740) lands at MCAS El Toro on 1 June 1990. This was one of the Hercules aircraft assigned to the US Navy's Antarctic Development Squadron Six (VXE-6) 'Puckered Penguins,' which was based at NAS Point Mugu, California. The Squadron flew ski-equipped LC-130s on Antarctic supply missions on behalf of the National Science Foundation. These missions began in 1961 and lasted until the 139th AS took over in 1998. LC-130Rs were painted Engine Gray (FS16081), Aircraft Gray (same as ADC Gray), and International Orange. (Ted Carlson/Fotodynamics)

(Left) A VMGR-234 'Thundering Herd' KC-130T (QH-308/BuNo. 162308) flies over the California desert on 30 June 1998. This Marine Air Reserve unit operated from NAS Glenview, Illinois. The Hercules' Fowler flaps are fully extended for slow speed flight. The KC-130T is powered by 4910 SHP Allison T56-A-423 engines and is equipped with a Bendix AN/APS-133 radar in the nose. The Marine Corps also operates two KC-130T-30s, which are stretched KC-130Ts. In 1963, a KC-130F (BuNo. 149798) became the heaviest aircraft to operate from a carrier. It made 29 touch-and-go landings/takeoffs and 21 landings, followed by 21 unassisted takeoffs from USS FORRESTAL (CVA-59). (Ted Carlson/Fotodynamics)

An EC-130G (BuNo. 151891) was converted into a TC-130G crew trainer. It is primarily used as a logistical support aircraft for the US Navy's Flight Demonstration Team, the Blue Angels. The Marines fly and maintain this Hercules, affectionately known as 'Fat Albert.' This TC-130G is parked at Springfield, Illinois for a Blue Angels display in 1994. (Lou Drendel)

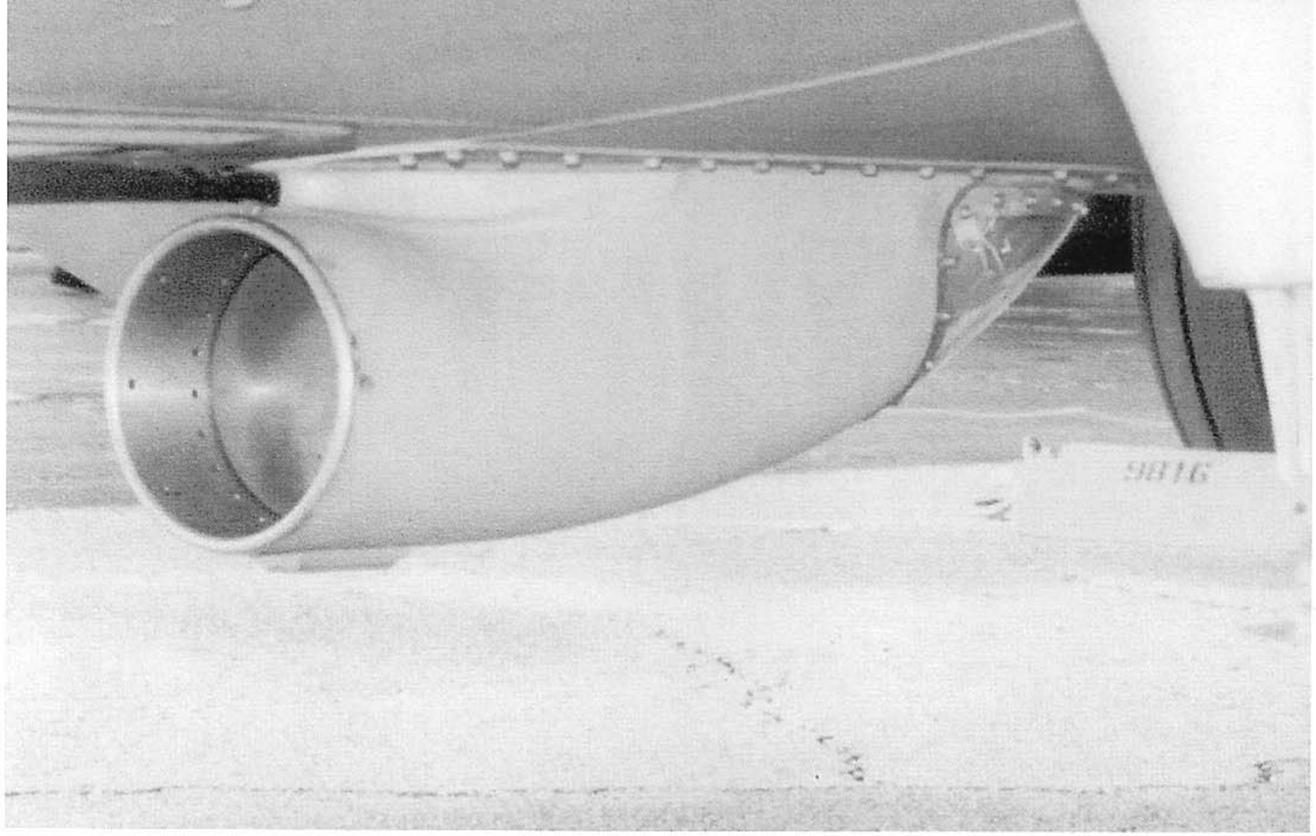
'Fat Albert' is an integral part of the Blue Angels demonstration, starting with a demonstration of the Rocket Assisted Takeoff (RATO). This provides a 45° angle of climb and a zero-G (zero gravity) pushover just prior to rocket motor burnout. RATO bottles are jettisoned soon after launch. The Blue Angels are based at NAS Pensacola, Florida. (John Gourley)

The TC-130G and other Hercules variants have a Gas Turbine Compressor (GTC) located in the forward port wheel well. It supplies air for ground operation of the air turbine motor, engine starting, nacelle preheat, and air conditioning system. Fuel for the GTC may be supplied from any tank. Navy and Marine aircraft have access door inner surfaces painted Insignia Red (FS11136). (Lou Drendel)

(Above Left) This EC-130E RIVET RIDER (63-7869) is displayed at Warner Robbins AFB, Georgia in November of 1988. It is assigned to the 193rd Electronic Combat Squadron (now Special Operations Squadron; SOS), Pennsylvania ANG at Harrisburg International Airport (IAP). This aircraft is employed for psychological warfare by broadcasting information over an enemy's radio and television channels. A large dorsal 'fillet' antenna is fitted at the tail, while two hatchet-shaped antennas are mounted under the wings. (Frank Mirande)

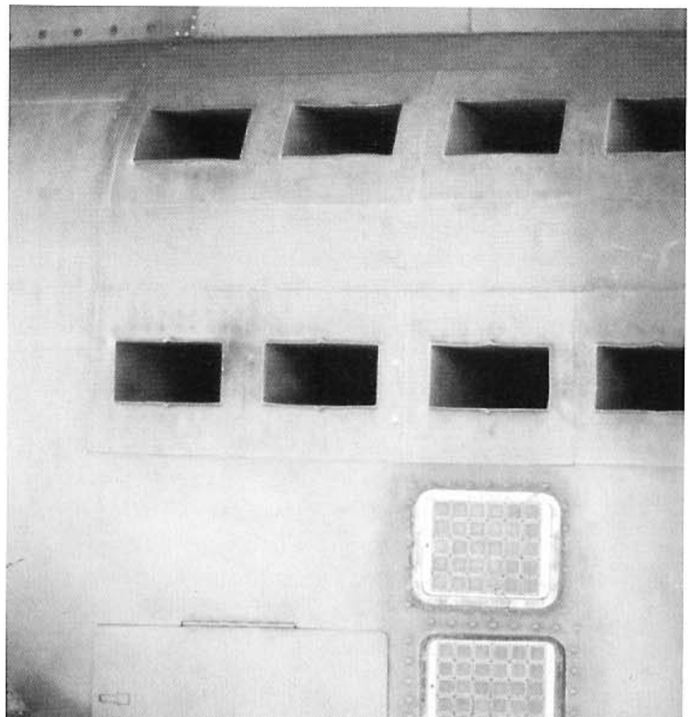
(Above) An upgraded EC-130H (64-14862) assigned to the 41st ECS, 355th Wg makes its final approach to Nellis AFB, Nevada on 23 March 1988. Four pod-shaped low frequency TV antennas on the vertical tail have replaced the dorsal 'fillet' antenna. Large underwing antenna pods complemented the earlier 'hatchet' antennas. The upgraded version broadcasts color TV over various worldwide frequencies. Other modifications include installation of aerial refueling capability and an electronic countermeasures system (RIVET FIRE). (Ted Carlson/Fotodynamics)

(Left) An EC-130E RIVET RIDER (63-7773) assigned to the 193rd SOS is parked on the tarmac. A large heat exchanger pod is mounted above the landing gear sponson; an identical pod is mounted to starboard. This reduced the great amount of heat generated by electronic equipment inside the cargo hold. Most different clandestine operations units were pooled under a separate major command when Air Force Special Operations Command (AFSOC) was formed in 1990. These were redesignated as Special Operations Squadrons and Wings. (John Gourley)

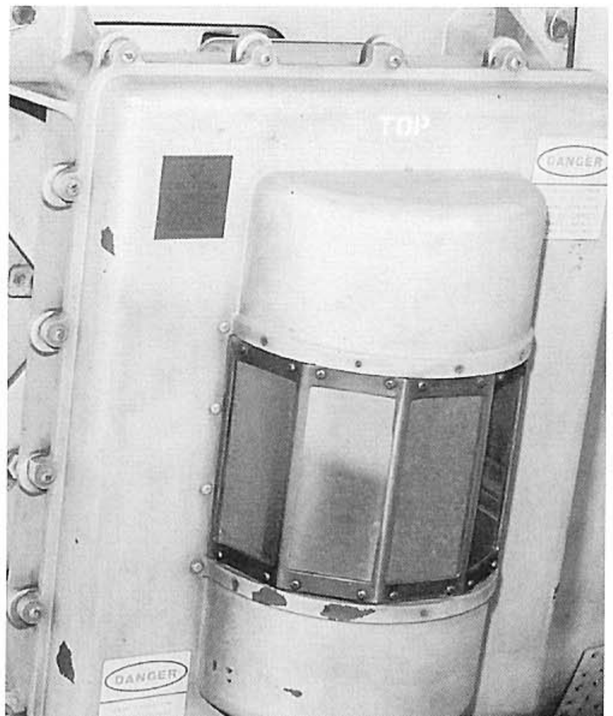


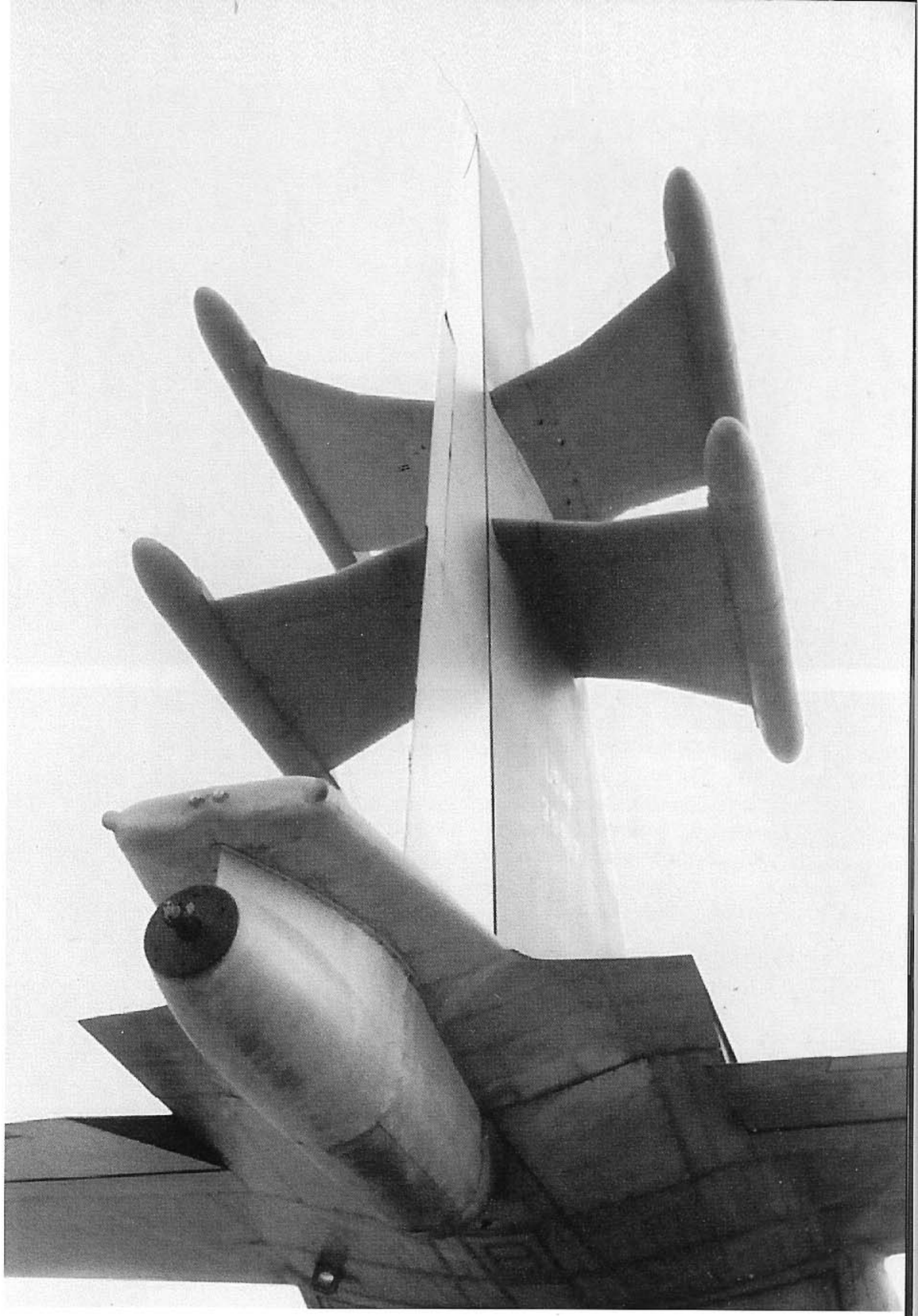
A ram air intake is mounted on the EC-130E's fuselage undersurface. Outside air is ducted through here into the vast amount of electronic gear inside the cargo bay. A light is mounted inside the clear aft section of this intake. (John Gourley)

Eight chaff launching chutes are mounted in the main landing gear sponsons, immediately forward of the paratroop air deflectors. These release chaff (aluminized plastic film) to counter radar-guided missiles. Two Tracor AN/ALE-40 flare dispensers below these chutes launch flares to decoy heat-seeking missiles. (John Gourley)



A Loral AN/ALQ-157 Infrared Countermeasures (IRCM) device is mounted on both EC-130E main landing gear sponsons. This active IR device sends heat pulses some distance from the aircraft for countering heat-seeking missiles. The bolted-on cover plate is removable for servicing the AN/ALQ-157. (John Gourley)

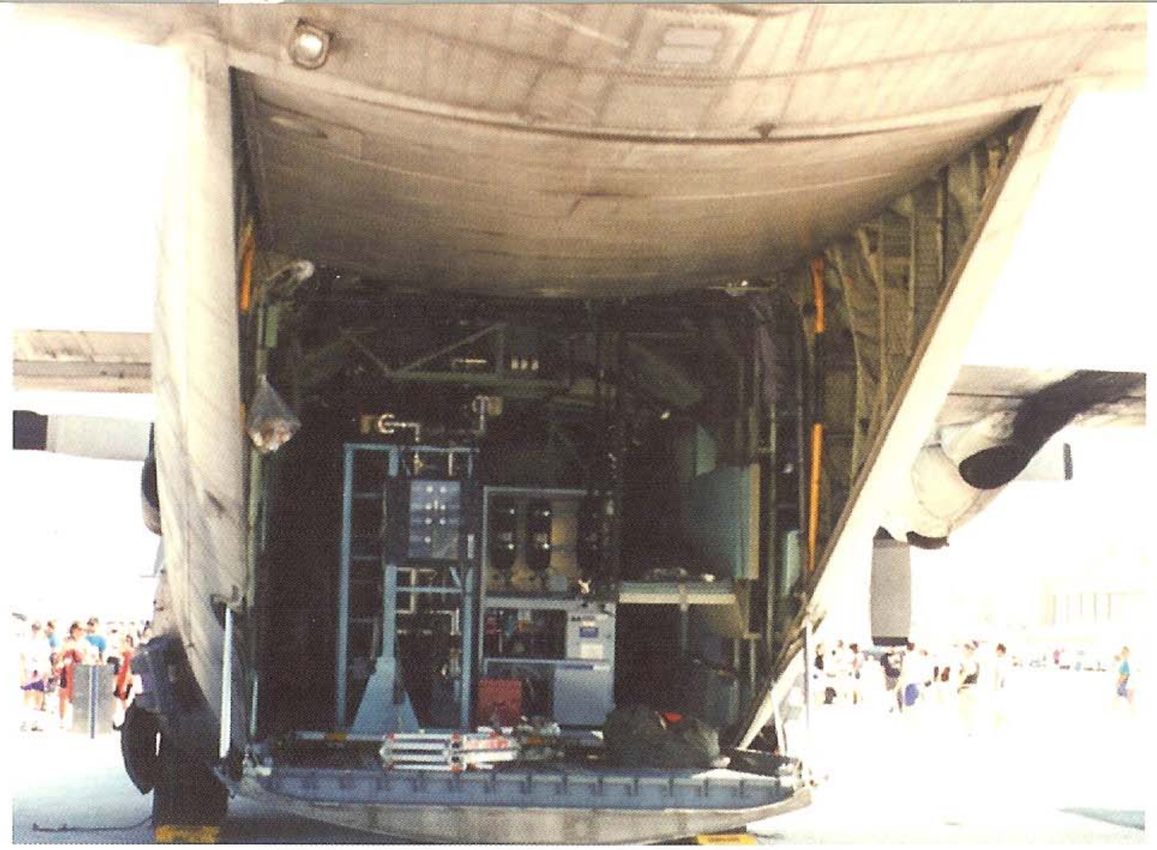




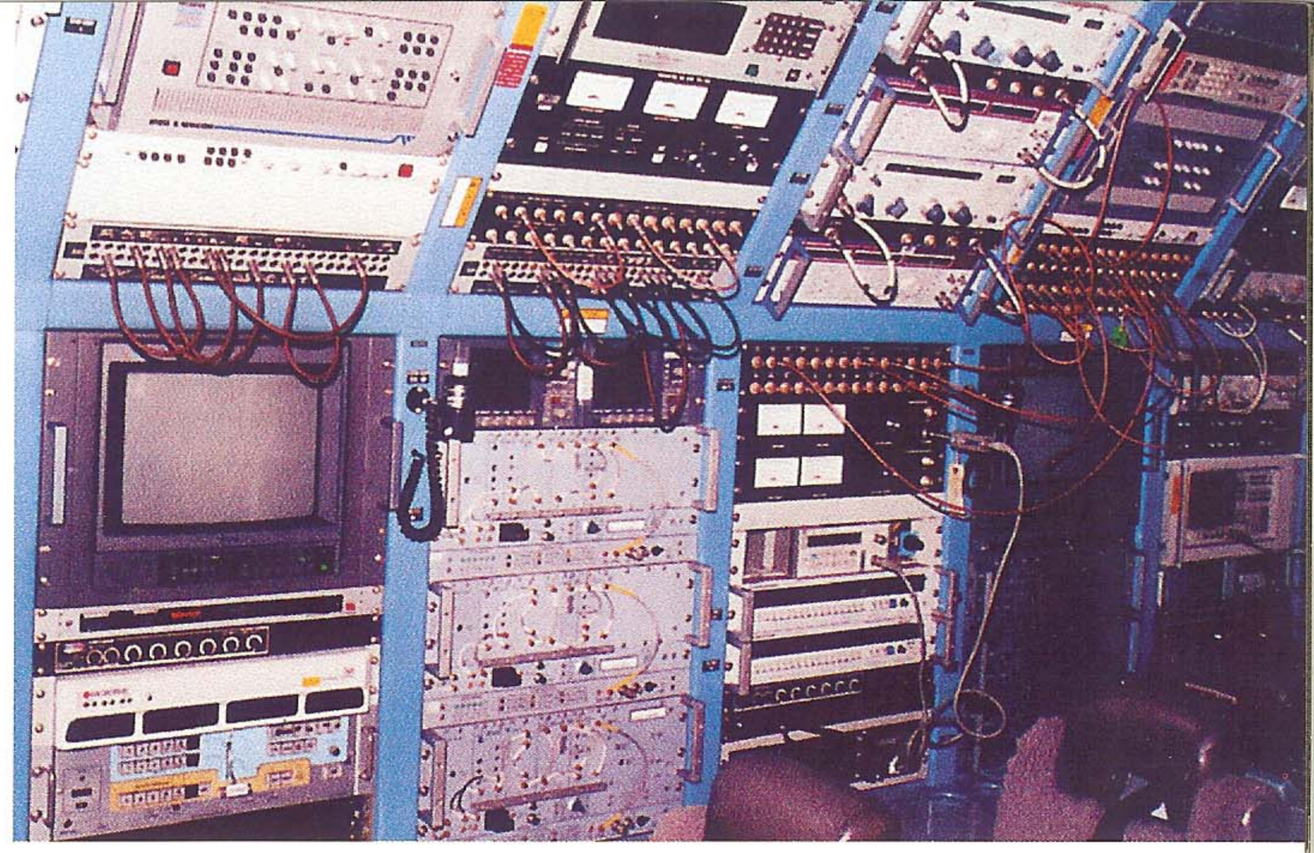
Lockheed modified six EC-130Es for the RIVET RIDER mission. The modifications included adding four pod antennas to the vertical fin and a retractable trailing wire antenna under the boat tail. The RIVET RIDERs have an unrefueled range of 2800 nautical miles (3224.2 miles/5188.8 KM). (John Gourley)

(Above) An EC-130E RIVET RIDER (63-9816) assigned to the 193rd SOS, 193rd Special Operations Group (SOG), Pennsylvania ANG is parked at Andrews AFB, Maryland on 10 May 1997. RIVET RIDER is a dedicated TV and radio broadcast/rebroadcast platform, capable of intercepting radio and TV broadcasts and modifying the content to suit a psychological operations mission before rebroadcasting. This is the latest version, modified to handle color TV broadcasting. RIVET RIDER EC-130s were widely used during Operation DESERT STORM in early 1991. The aircraft is painted Dark Ghost Gray and Gray (FS36492). (Tom Hildreth)

(Left) A 'farm' of blade antennas is mounted on the main landing gear door of this EC-130E COMFY LEVI aircraft (63-7828) assigned to the 193rd SOS. These antennas are associated with the SENIOR SCOUT radio signal monitoring system. Additional antennas are mounted on the aft cabin doors, undercarriage sponsons, and tail. An Airborne Collection Electronic Signals II (ACES II) capsule is installed within the cargo bay, with room for four to 12 system operators. They scan 2 Megahertz (MHz) to Very High Frequency (VHF) bands in the Communications Intelligence (COMINT) role. The operators also monitor 2 to 18 Gigahertz (GHz) bands in the Electronic Intelligence (ELINT) role. (John Gourley)

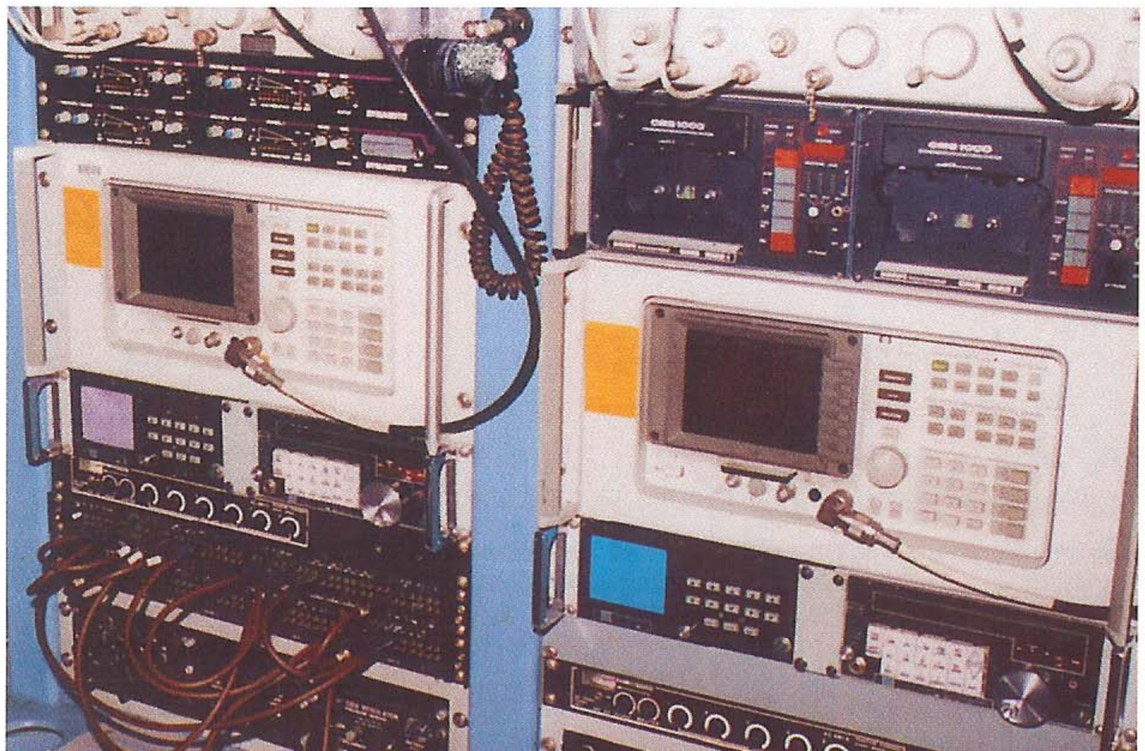


Specialty palletized equipment is loaded into the EC-130E's cargo bay, depending upon the mission flown. This allows easy equipment changes for maintenance and system upgrades. RIVET RIDER and COMMANDO SOLO versions perform psychological warfare operations. These EC-130Es have fire suppressant foam in the fuel tanks, Radar Homing And Warning (RHAW) equipment, and self-contained navigation systems. (John Gourley)



Battle management stations are located on the port side of the ACES II capsule fitted to EC-130E SENIOR SCOUT aircraft (63-7783). Operators at this location direct and control COMINT and ELINT activities. EC-130E SENIOR SCOUT and SENIOR HUNTER aircraft support COMMANDO SOLO EC-130s. (John Gourley)

Wideband and narrowband radio signals are monitored from these stations in the EC-130E's port side. System operators seek and jam enemy communications and coordinate COMINT and ELINT efforts with friendly forces. The self-contained ACES II capsule can be removed from the EC-130E for servicing.



Systems operators check the displays in an EC-130E Airborne Battlefield Command and Control (ABCC) aircraft. This version carries the USC-48 Airborne Battlefield Command and Control Center Capsule. The ABCC is tasked with aerial command for coordinating air to ground missions. These EC-130Es are also fitted with antennas, heat exchanger pods, aerial refueling, and USC-48 mounting rails.

An EC-130H COMPASS CALL (DM/73-590) flies over the high desert of California on 18 January 1996. This aircraft is assigned to the 43rd Electronic Combat Squadron (ECS) 'Bats,' 355th Wing (Wg) at Davis-Monthan AFB, Arizona. Twelve C-130H transports and four HC-130H rescue aircraft were modified to EC-130H standard. COMPASS CALL aircraft jam enemy communications and command and control systems, using the RIVET FIRE jamming system. The aircraft has a four-man flight crew plus a nine-man mission crew. This EC-130H is overall Gray with a red tail band and low-visibility markings. (Ted Carlson/Fotodynamics)

A 43rd ECS EC-130H (SB/73-1583) flies over Nellis AFB on 7 July 1990. This Squadron was assigned to the 66th Electronic Combat Wing (ECW) at Sembach AB, West Germany from May of 1987 until May of 1991. The 66th ECW was then disbanded and the 43rd ECS transferred to Davis-Monthan. This aircraft is equipped with 1360 gallon (5148.1 L) underwing fuel tanks. Various antennas are mounted on the fuselage undersurface and sides. (Ted Carlson/Fotodynamics)

A 41st ECS, 355th Wg EC-130H (64-14862) has lowered its landing gear for final approach to Nellis AFB on 23 March 1988. It was painted Dark Ghost Gray and Gray, with low visibility markings. Wire antennas for long-range air-to-air and air-to-ground communications originate on the upper forward fuselage. These antennas run aft to the vertical tail. A cooling air intake is mounted on the forward end of the port landing gear sponson. This combines with another cooling duct on the upper sponson and starboard side intakes to cool the large amount of electronic equipment inside the cargo bay. The mission crew is commanded by an Electronic Warfare Officer (EWO). A cryptographer also serves as the mission supervisor, plus there are six operators and a technician for in-flight equipment maintenance.

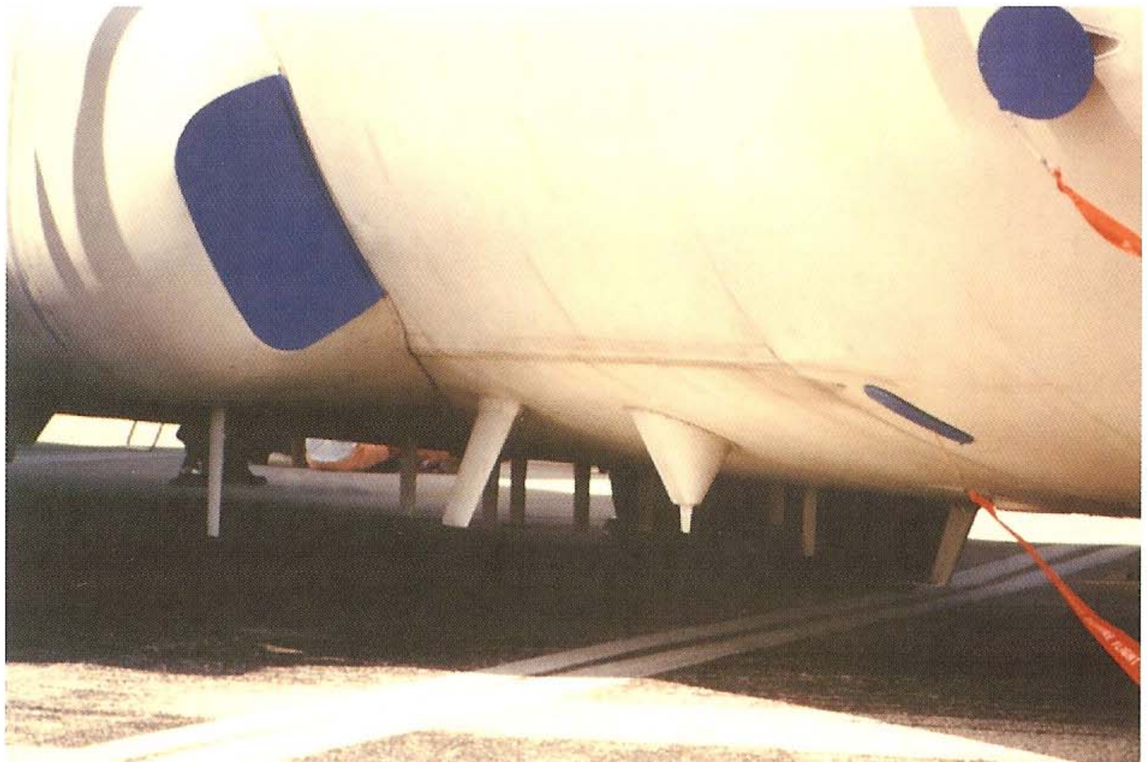
(Above) An EC-130H COMPASS CALL (73-583) of the 43rd ECS flies over the Nellis Ranges of Nevada on 27 June 2001. This is believed to be during a RED FLAG exercise, in which US and allied air units train for coordinated air campaigns against simulated enemy defenses. An aerial refueling receptacle is mounted on the upper fuselage above the flight deck. Mission endurance is extended through aerial refueling. The ideal mission altitude is the maximum cruise ceiling of 26,500 feet (8077.2 M). (Ted Carlson/Fotodynamics)

(Left) The same EC-130H COMPASS CALL (73-583) forms below and aft of another aircraft while flying over the Nellis Ranges. The blade and wire antennas on both forward fuselage sides are unique to this variant. The specific purpose of these antennas is unknown. It is believed that the COMPASS CALL's electronic suite can jam either specific enemy radio networks or a range of frequencies. A windshield wiper is provided for each pilot's forward window to clear away precipitation. (Ted Carlson/Fotodynamics)

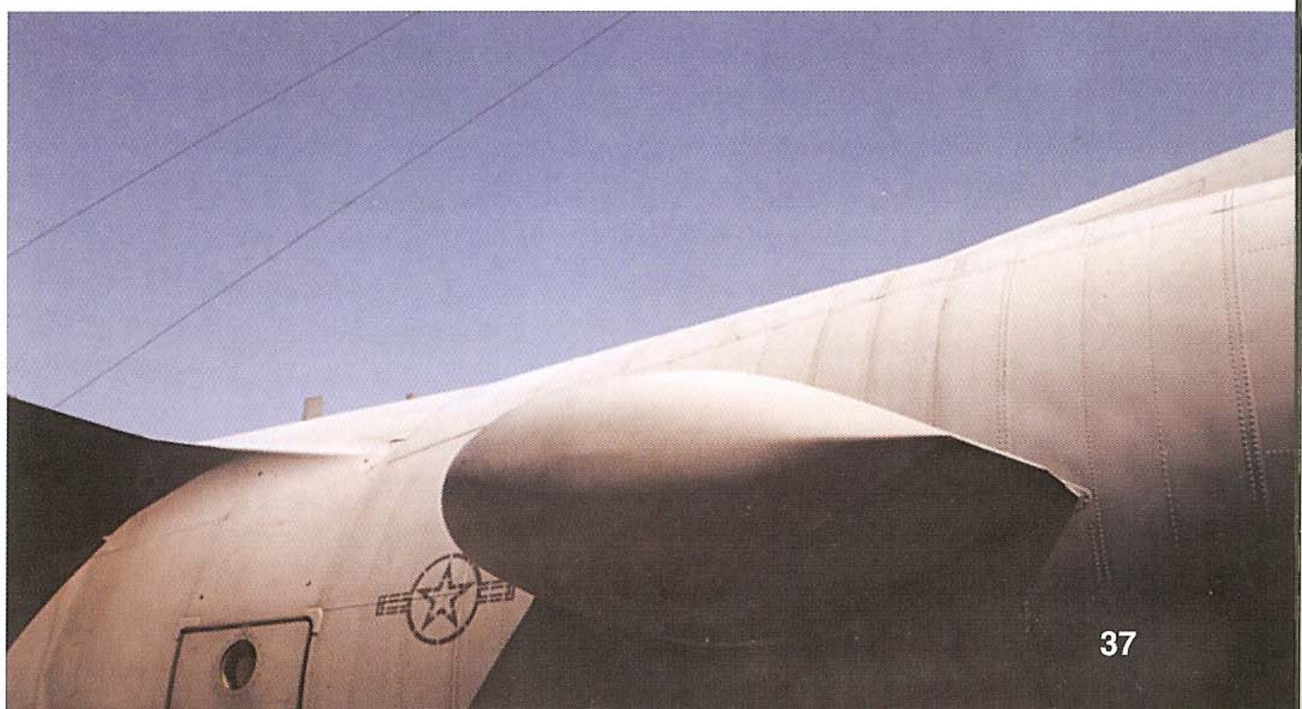
Distinctive blisters and intakes are mounted on the EC-130H COMPASS CALL sponsons. Main landing gear doors are open past their normal open limits for maintenance. This aircraft is assigned to the 42nd Airborne Command and Control Squadron (ACCS), 355th Wg. An air hose is fitted to the GTC intake. (Damon Blair)

Blue covers are fitted over the starboard sponson intakes on this EC-130H COMPASS CALL (73-1594). These prevent Foreign Object Damage (FOD) to these sensitive areas. A heat exchanger grill is mounted immediately aft of the blade and wire antennas. This EC-130H is assigned to the 43rd ECS, 355th Wg at Davis-Monthan. The black outline Wing insignia is painted on the fuselage side. (John Gourley)

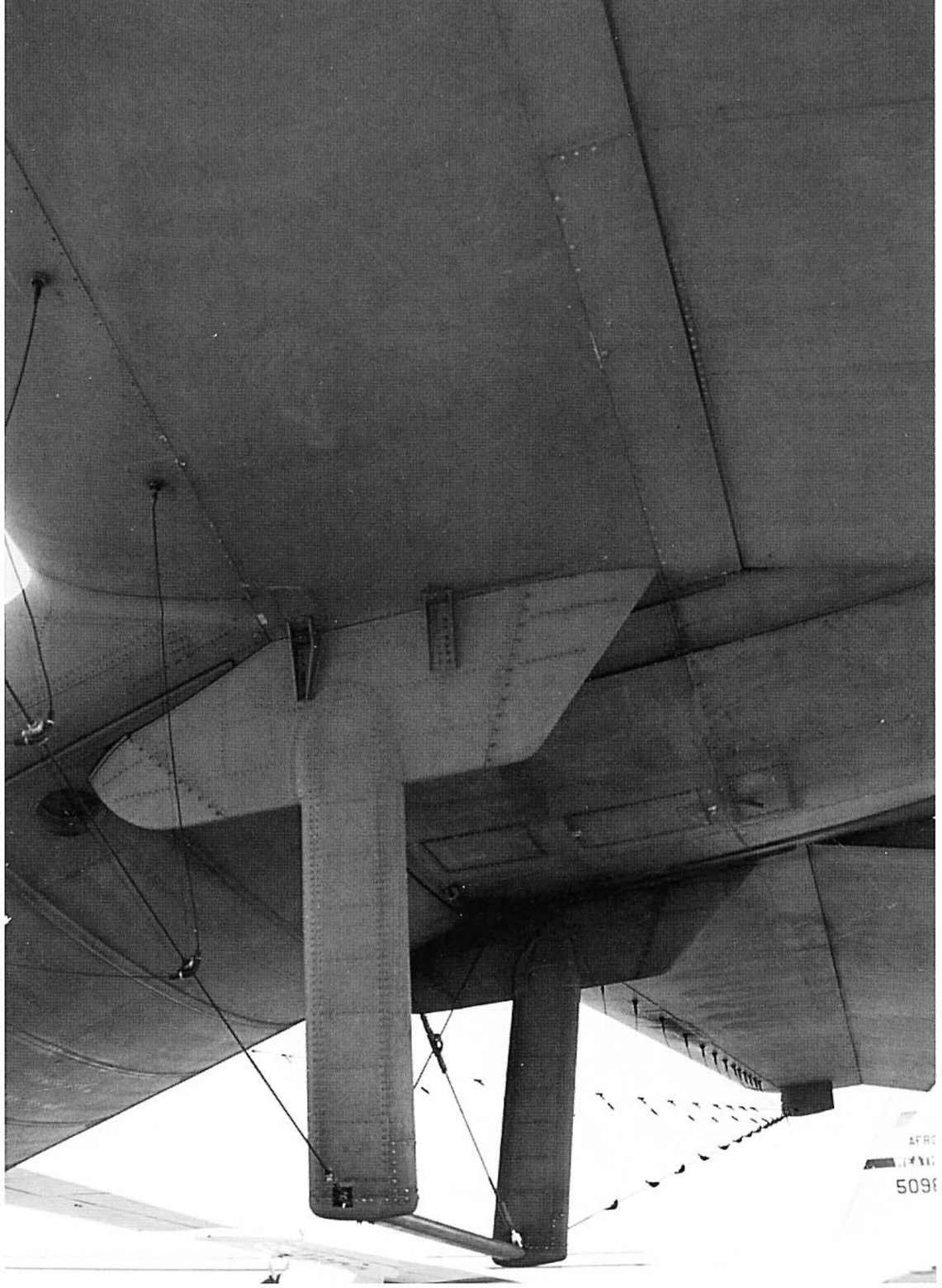
Various antennas are mounted under the starboard fuselage side of this COMPASS CALL aircraft. These are associated with various detection and jamming equipment located in the cargo area and operated by the mission crew. (John Gourley)



A large blister fairing is fitted to the aft fuselage of the EC-130H COMPASS CALL. This is the port fairing; another blister is mounted on the opposite side. Various classified jamming equipment is housed within this fairing. The blister is located aft of the paratroop door, while the low visibility national insignia is painted between these items. (John Gourley)



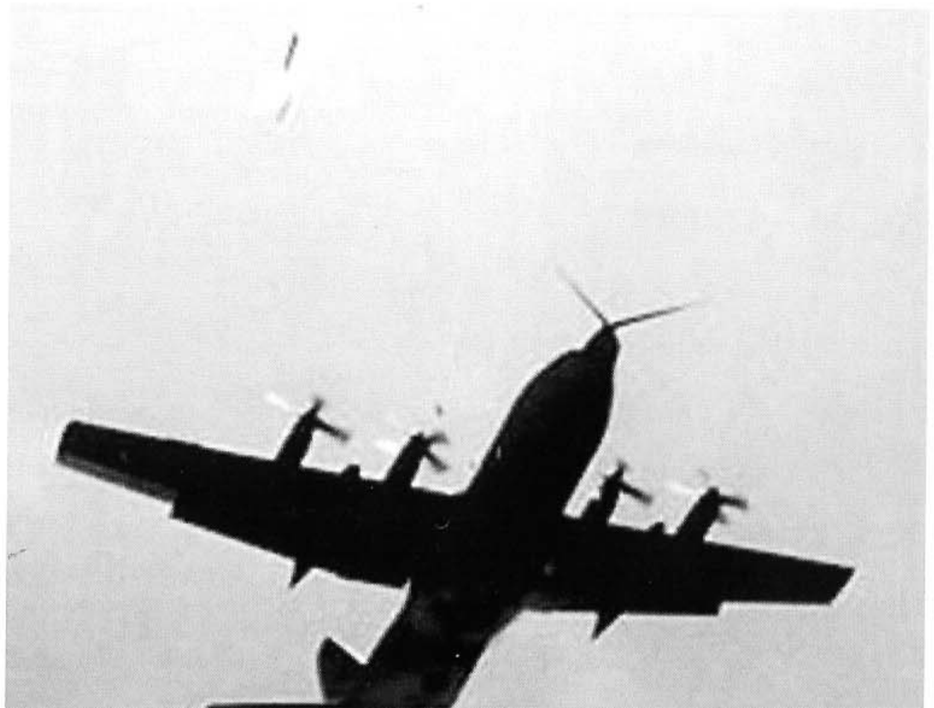
Antenna wires are mounted on the upper and lower tail surfaces of this EC-130H COMPASS CALL (DM/73-587). One wire runs from the vertical fin to the upper horizontal stabilizer, with additional antennas running from the wire down to the stabilizer upper surface. Static dischargers are placed on the rudder's trailing edge. COMPASS CALL integrates into the tactical air campaign at any level, although its primary mission concerns interdiction and offensive counter-air operations (John Gourley)



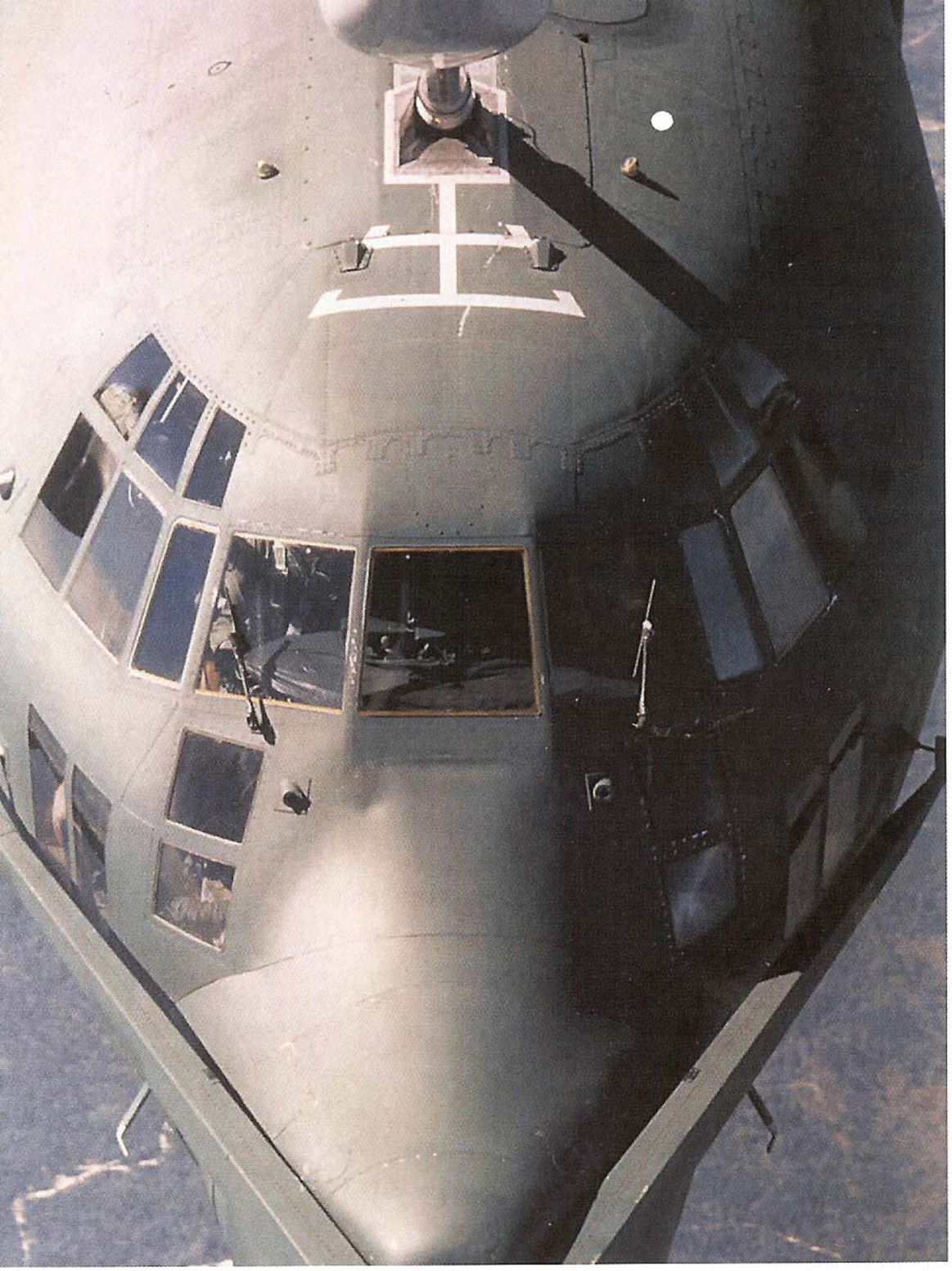
An antenna bracket is mounted on the tail undersurface of the EC-130H COMPASS CALL. Wire antennas associated with jamming equipment run between the bracket and the tail undersurfaces. COMPASS CALL EC-130s were among the primary instruments in rendering Iraqi military communication systems inoperable during Operation DESERT STORM. (John Gourley)

An MC-130E COMBAT TALON I (64-559) departs Nellis AFB on 24 January 1990. The COMBAT TALON mission is to provide global day, night and adverse weather capability to airdrop and airland personnel and equipment for supporting special operations forces. Mission equipment includes specialized avionics, refueling hose pods on the outer wing pylons, and Radar Warning Receiver (RWR) antennas in an extended tail section. This MC-130E is painted in the three-tone European I camouflage of Dark Green, Gunship Green, and Gunship Gray. (Ted Carlson/Fotodynamics)

This MC-130E has extended the two forks of the Fulton Surface To Air Recovery (STAR) system from its nose. The forks engaged a 450 foot (137.2 M) line held aloft by a helium-filled balloon, which drifts ahead of the MC-130E's starboard wing. The forks then snared the line, causing the person or equipment on the ground to be swept into the air. The object was carried aft and recovered using a hydraulic winch by a crew waiting on the opened cargo ramp. Cables ran from the MC-130E's nose to the wingtips to prevent the line from tangling with the propeller blades. The USAF first tested the Fulton STAR system in 1966 and employed it until improved rescue helicopters ended the STAR's use in 1998.



An MC-130E COMBAT TALON I refuels from a Boeing KC-135 Stratotanker. The tanker's boom fits into a receptacle built into the Hercules' fuselage. White lines in front of the receptacle assist the boom operator in lining up the boom. Long duration missions make aerial refueling a necessity for special operations Hercules. The STAR forks are folded back on this aircraft. (USAF)

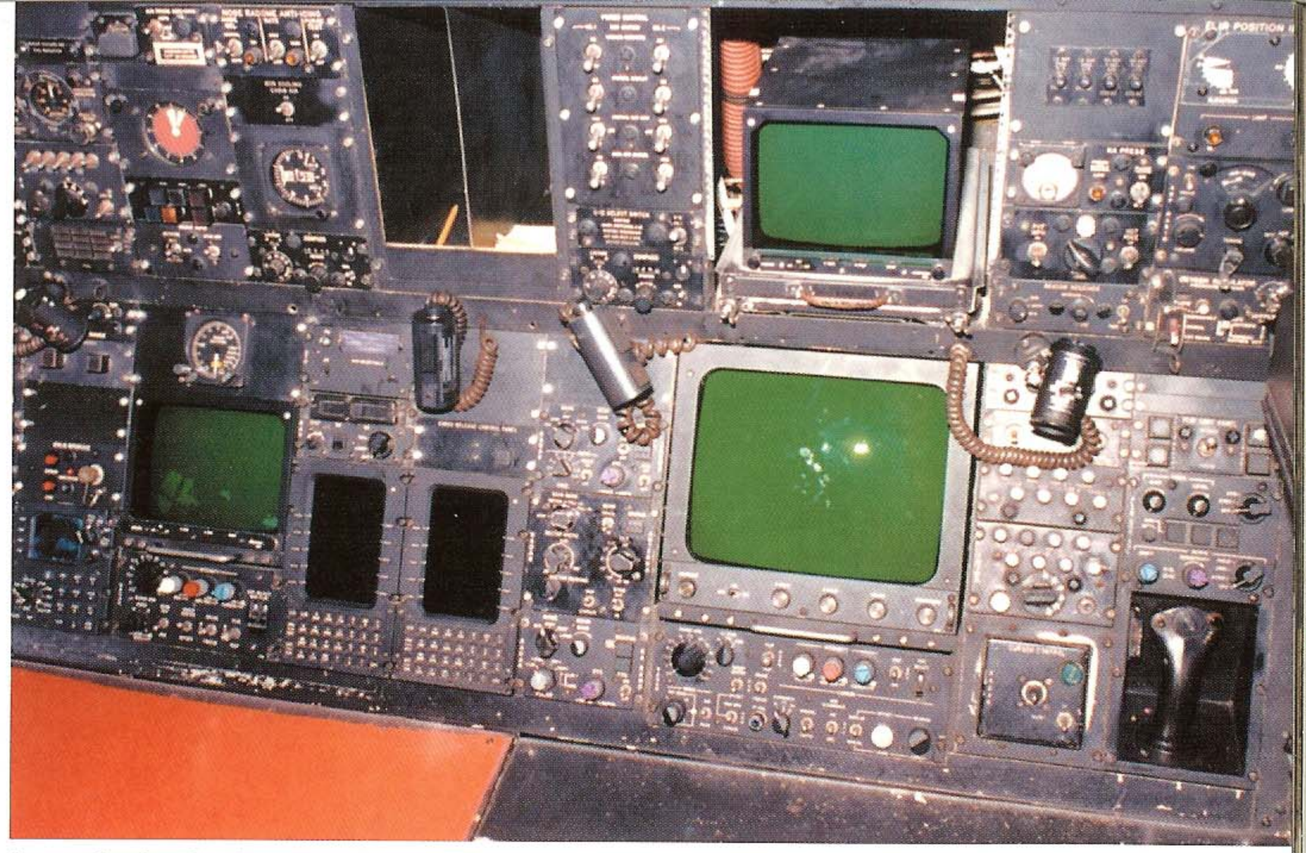


An MC-130E receives fuel from a KC-135 during a mission. The pilot opens the front-hinged refueling receptacle door, which exposes the receptacle to the refueling boom. Refueling lights are enclosed in two small fairings ahead of the receptacle. The US Air Force equipped nine MC-130Es with the Fulton STAR system for extracting personnel and equipment from the ground. This COMBAT TALON I's forks are retracted aft when not employed on lifting operations. (Ted Carlson/Fotodynamics)

This MC-130E (64-562) flies over Nellis AFB on 13 April 1993. The Hercules is assigned to the 8th SOS, 16th SOW at Hurlburt Field, Florida. It has a deep helicopter refueling role during special operations missions. The MC-130E can refuel two helicopters at a time using the wing-mounted refueling pods. In the early 1990s, AFSOC began painting their special operations aircraft Dark Ghost Gray (FS36320) over Gray (FS36492). (Ted Carlson/Fotodynamics)

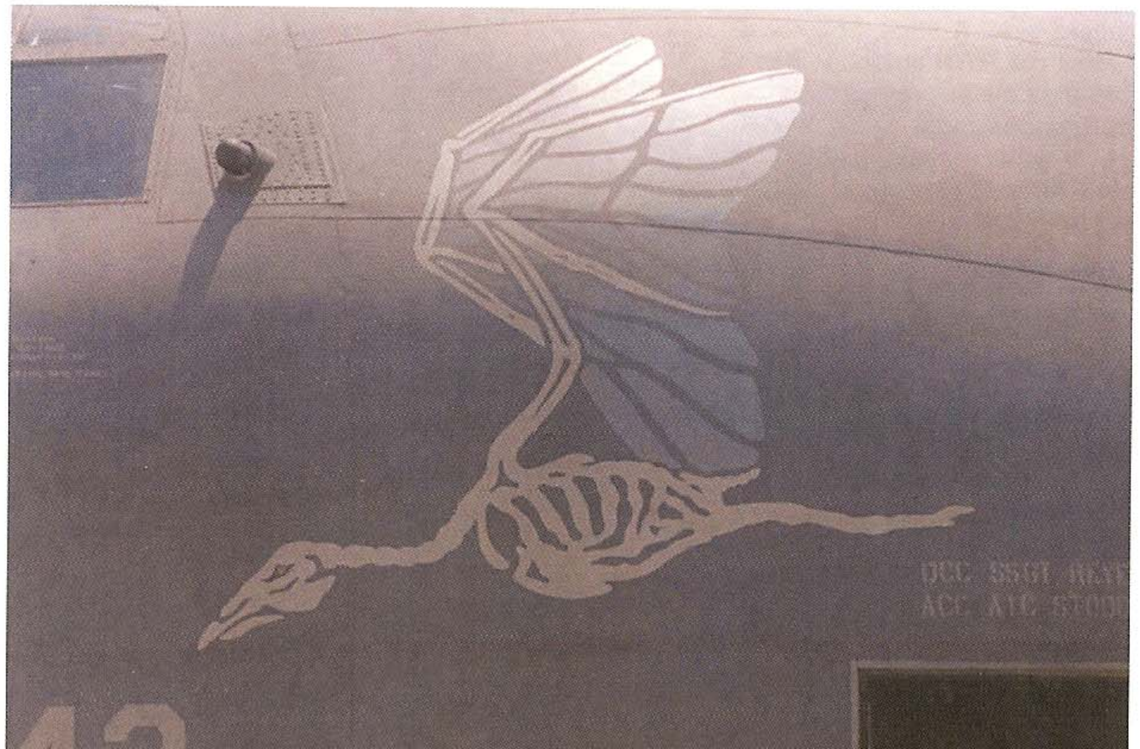
An MC-130E COMBAT TALON I (64-559) assigned to the 8th SOS is parked on the tarmac at Hurlburt Field. The distinctively-shaped radome houses the Raytheon (Texas Instruments) AN/APQ-122(V)-8 terrain following/terrain avoidance radar. (John Gourley)

An 'Electronic Crow' insignia is painted on the nose of this light gray MC-130E Mod 90 (64-565). The upgraded Mod 90 aircraft are equipped with an Inertial Navigation System (INS) and Global Positioning System (GPS) for improved navigational accuracy. An unknown black fairing is mounted under the lower cockpit windows. (John Gourley)

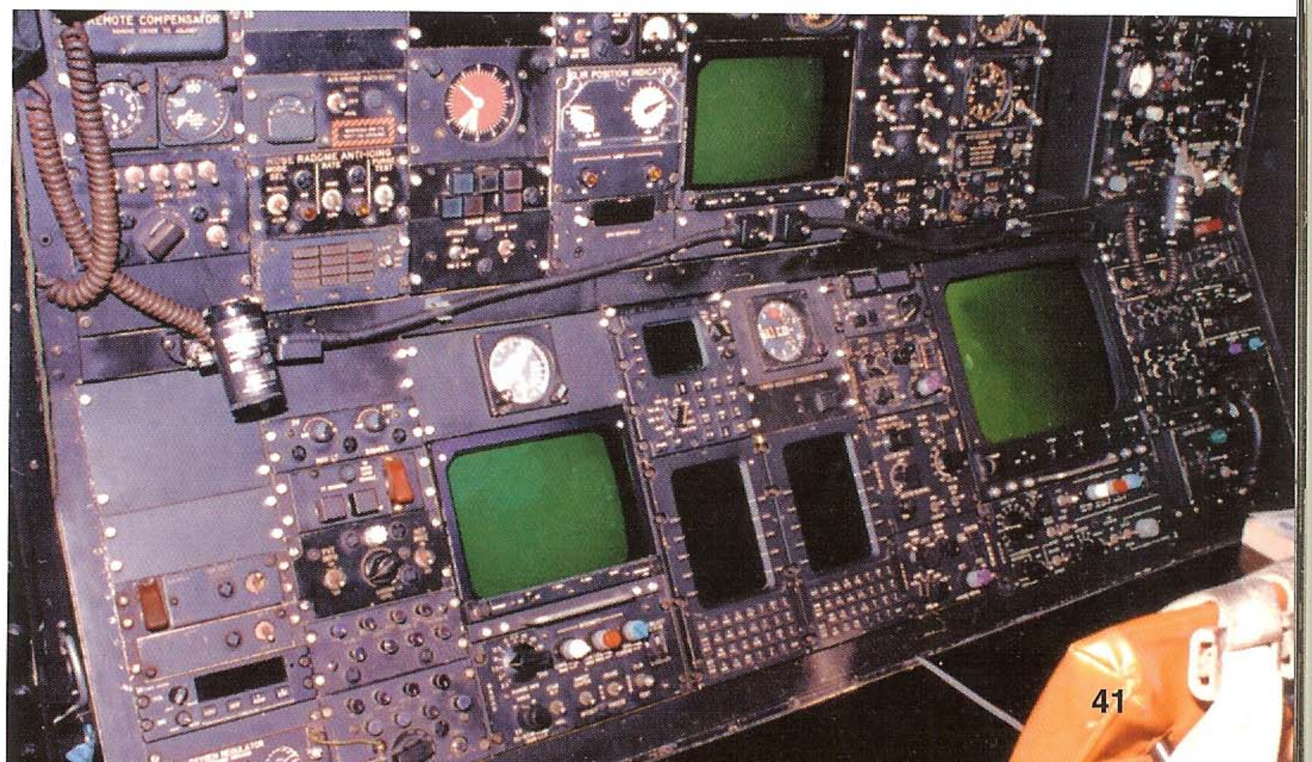


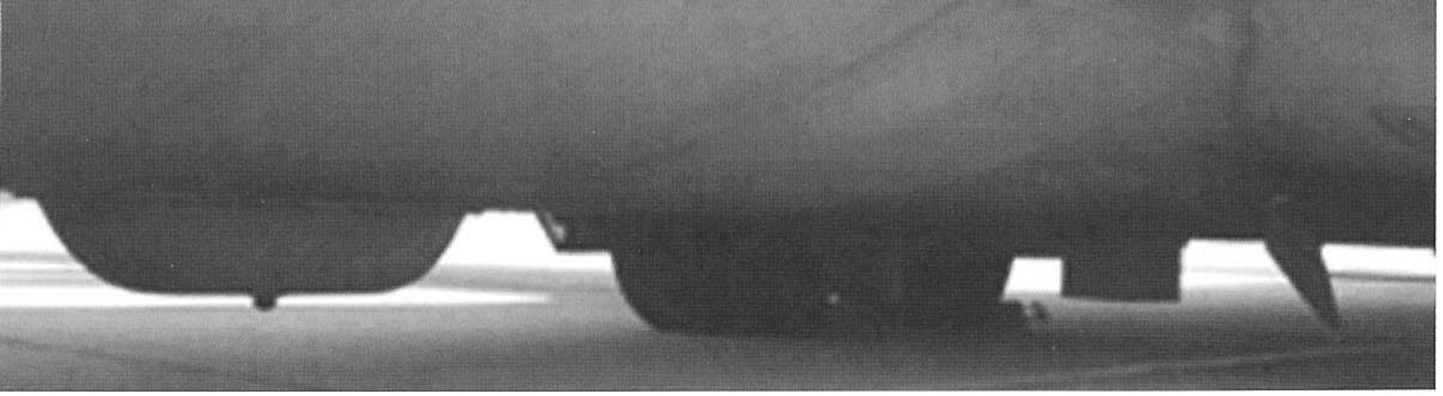
Immediately aft of the co-pilot's seat are the MC-130E's navigation and sensor stations. The operators seated here monitor the position of this and other aircraft in the vicinity and warn the flight crew of enemy threats. One of the equipment panels has been removed for either maintenance or security purposes. (John Gourley)

Skeletal bird artwork graces the nose of this 1st SOS MC-130E (62-1843). This Squadron is assigned to the 352nd Special Operations Group (SOG) at Kadena AB, Okinawa, Japan. During Operation DESERT STORM, MC-130Es dropped 15,000 pound (6804 KG) BLU-82/B 'Daisy Cutter' bombs and psychological warfare leaflets on Iraqi troop positions. (John Gourley)

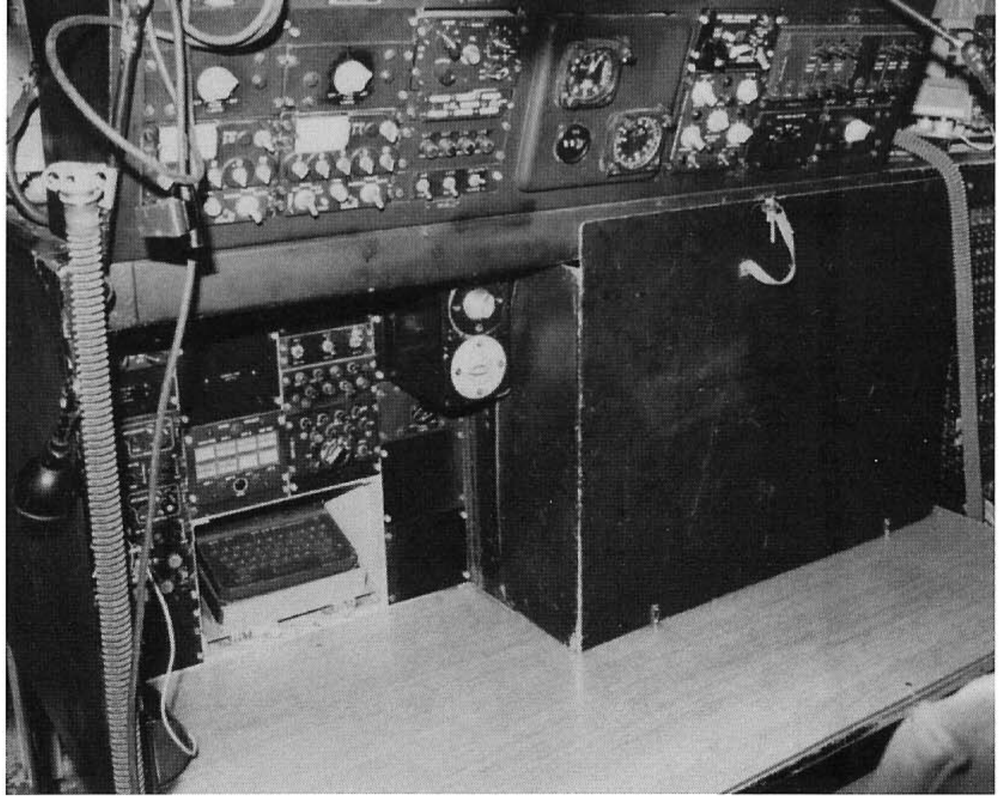


Mod 90 updated MC-130Es have modified displays for the navigator and sensor operator. INS and GPS receivers are fitted to the panel. Additionally, this aircraft has improved radar and Forward Looking Infrared (FLIR) displays. These presented a clearer picture of the tactical situation to these operators. (John Gourley)

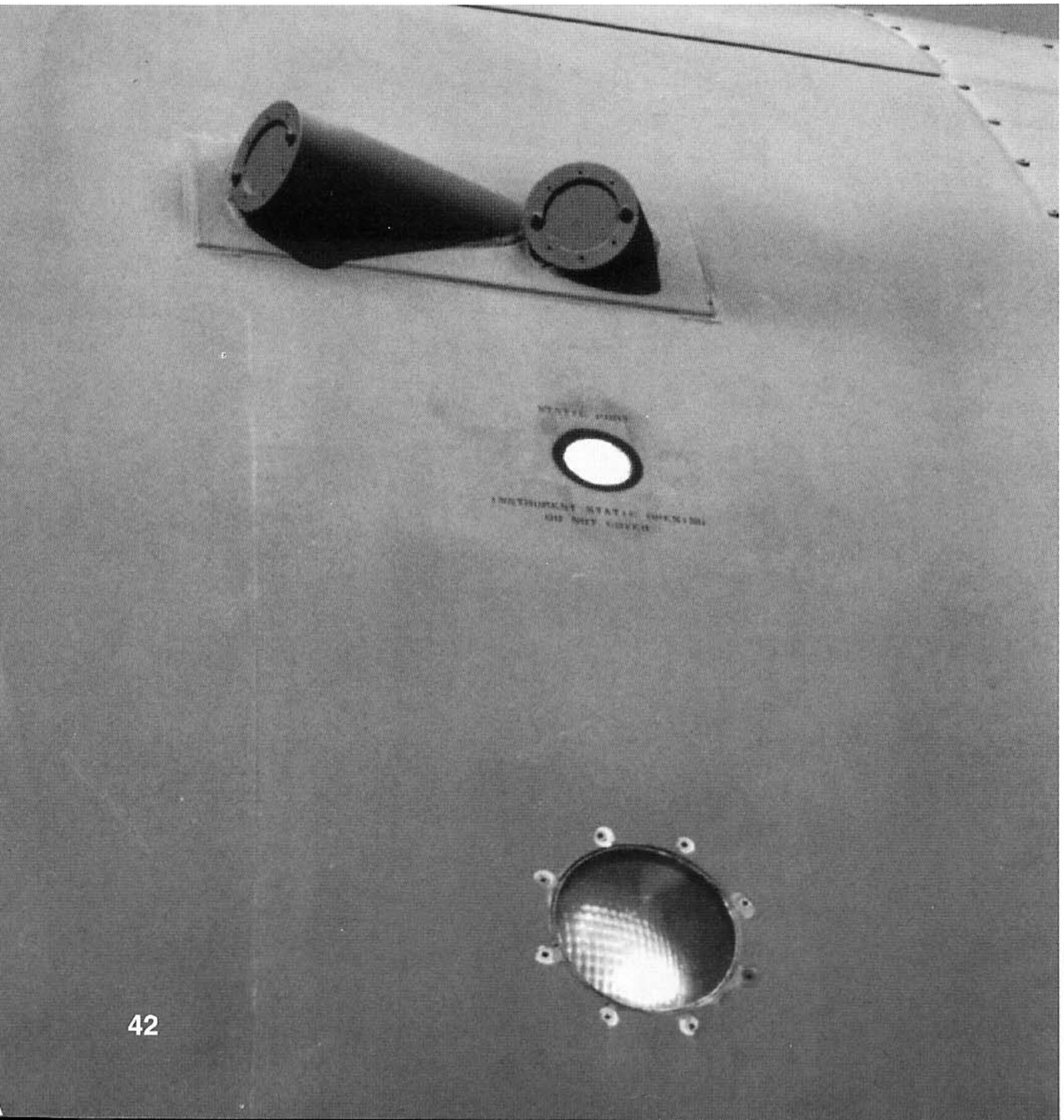




Three types of antennas are mounted under the center fuselage of an MC-130E (64-568) in July of 1992. The bathtub-shaped fairing houses an Itek AN/APR-36 homing and warning Electronic Countermeasures (ECM) receiver. Aft of this is the dark dome housing the Watkins-Johnson WJ-1840 (AN/APR-46) panoramic microwave receiver. A Northrop AN/ALT-32 communications jammer in the small cylindrical housing provides ECM against communications systems. (John Gourley)

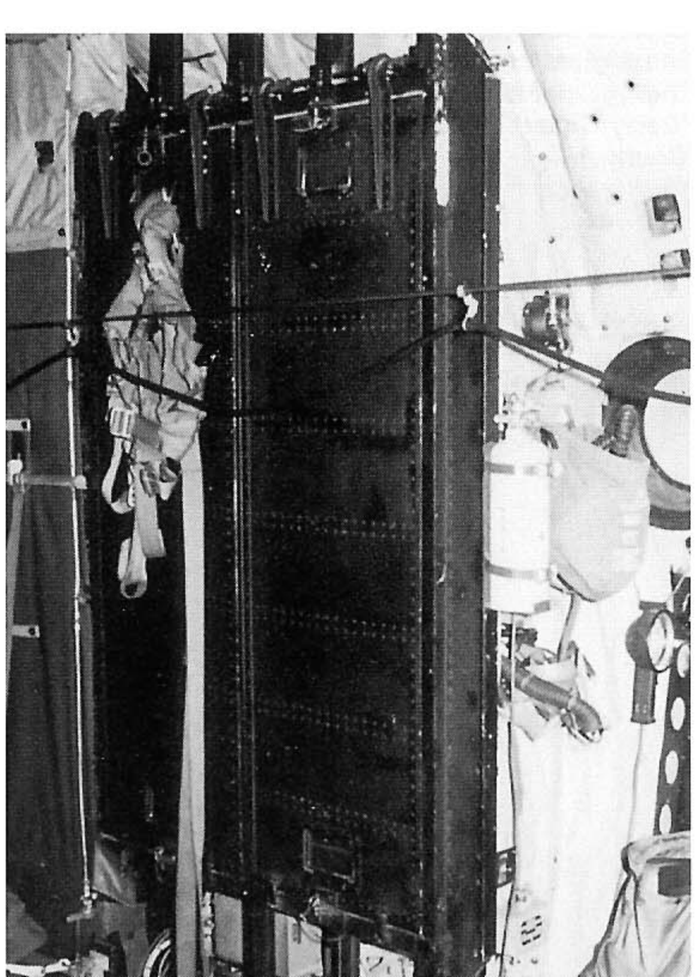


The MC-130E's Electronic Warfare Officer (EWO) occupies this station aft of the flight deck. He sat at a small desk, which was topped by EW equipment consoles. This position lacks the sophistication and effectiveness of the CRT-equipped Mod 90 and later MC-130 variants. (John Gourley)



(Left) Two Litton AN/ALR-69 Radar Warning Receiver (RWR) antennas are mounted on the MC-130E's port fuselage side, aft of the flight deck. The same antennas are fitted to the starboard side. A static port located below the RWR antennas senses the true static pressure on the aircraft under most flying conditions. A white navigation light is located further down the fuselage side. (John Gourley)

(Right) A chaff and flare bin is mounted inside the MC-130E's cargo hold, immediately forward of the paratroop doors. These expendable countermeasures are launched from the inside and are released through chutes in the main landing gear sponsons. (John Gourley)



Additional AN/ALR-69 RWR antennas are mounted on the MC-130E's aft fuselage sides, including this port side. One receiver is flush mounted on the side above the cargo door while another is mounted at an angle on the upper side near the base of the vertical stabilizer. (John Gourley)

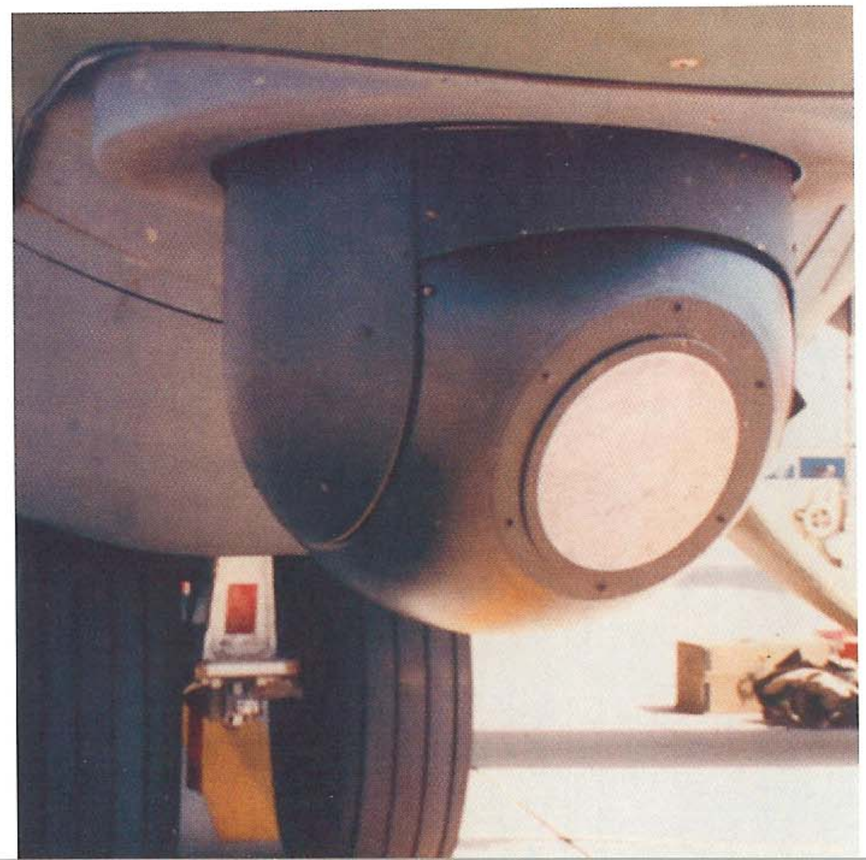
Paired RWR antennas are located along the MC-130's upper vertical stabilizer. These are angled to provide 360° coverage of opposition air-based and surface-based radars. A red anti-collision beacon is mounted atop the stabilizer, ahead of the rudder horn. (John Gourley)

Multiple RWR antennas were fitted to the extended tail section of the MC-130E COMBAT TALON. These are angled away from each other and shielded where necessary to provide the full spectrum of aft protection from threats. RWR readings are fed to both pilots and the EWO for countermeasures action. (John Gourley)

The MC-130E Mod 90 tail section houses a similar array of RWR antennas, but these are contained within the streamlined dielectric panels. This fairing offers less drag than the earlier MC-130E tail while offering slightly improved sensors. The 'around the clock' RWR antenna installation allows the crew to pinpoint threat locations. (John Gourley)

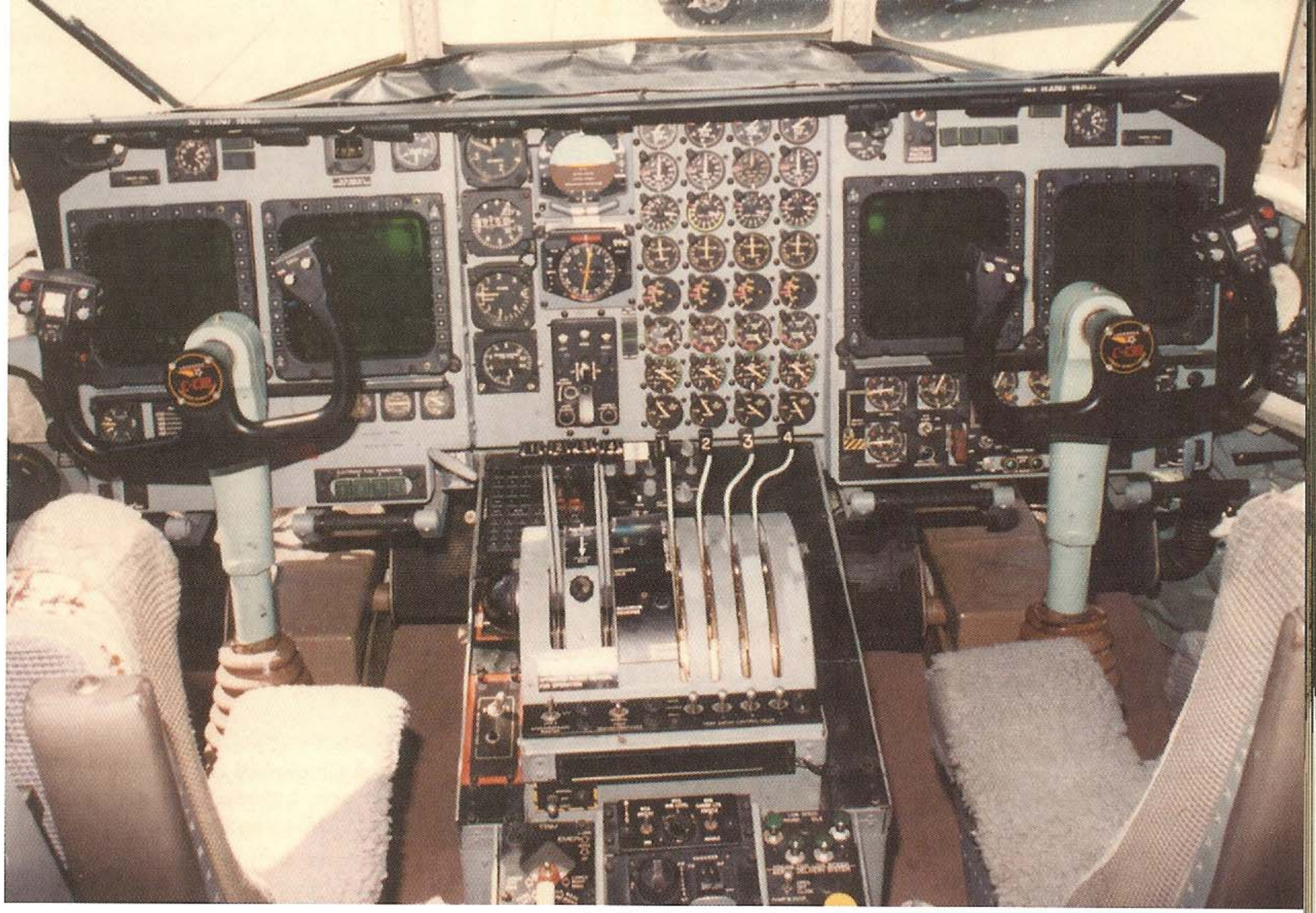
An MC-130H COMBAT TALON II (85-0011) flies aft of and below the tanker aircraft over New Mexico on 29 January 1998. This aircraft was assigned to the 550th SOS, 58th SOW, the special operations training wing at Kirtland AFB, New Mexico. The 24 COMBAT TALON II aircraft were originally delivered as C-130Hs, then modified by IBM Federal Systems Division with E-Systems avionics. (Ted Carlson/Fotodynamics)

This MC-130H (84-0475) was assigned to the 6512th Test Squadron (TS) at Edwards AFB, California on 6 October 1991. COMBAT TALON II aircraft feature an enlarged radome housing the System & Electronics AN/APQ-170 multi-mode radar. AN/ALR-69 RWR receiver fairings are mounted atop the canopy and under the lower cockpit windows. A Forward Looking Infrared (FLIR) turret is mounted on the radome's undersurface. (Ted Carlson/Fotodynamics)



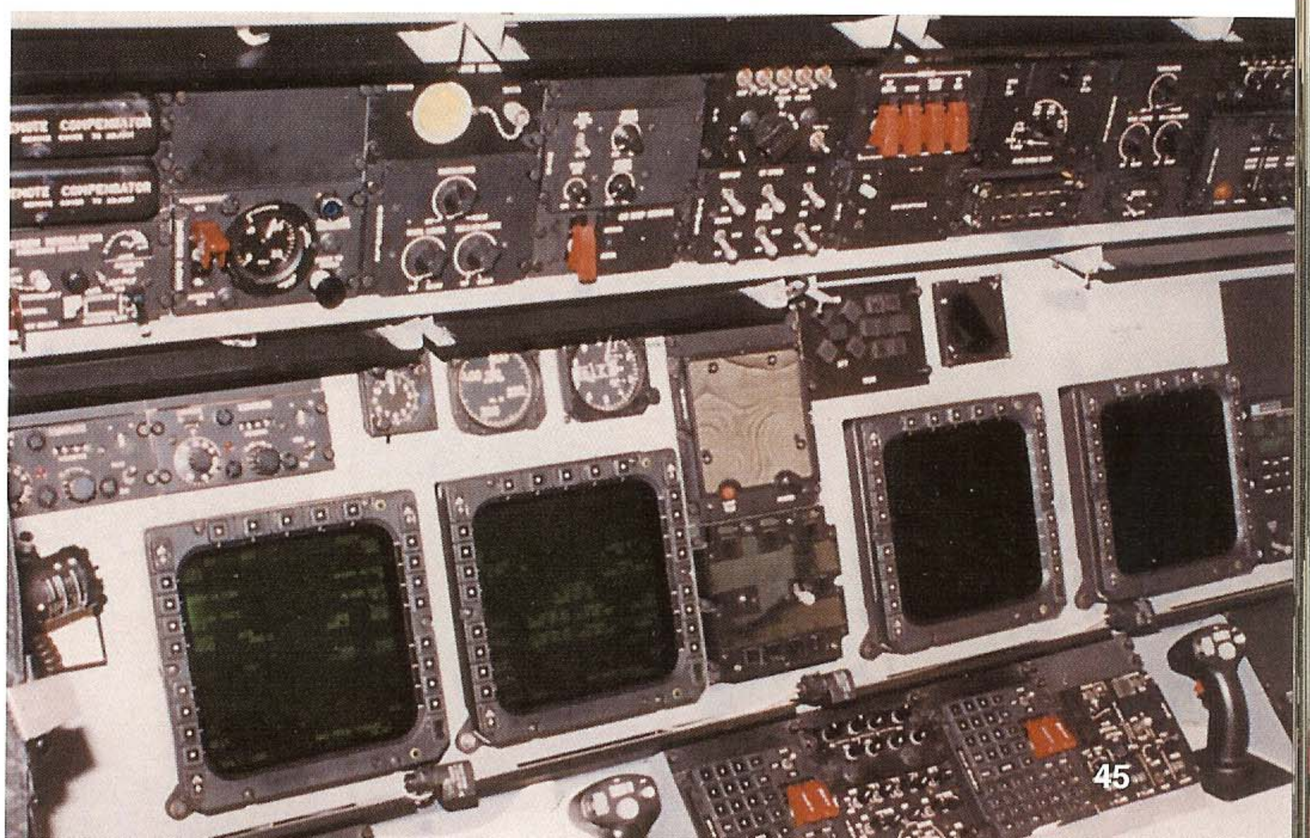
The Texas Instruments AN/AAQ-15 FLIR is housed in a retractable turret under the MC-130H's radome. This turret rotates a full 360° to provide IR images of the area below the aircraft. FLIR is used as an alternative to radar for low-level navigation, when stealth is necessary and radar signals can betray the aircraft's presence. (John Gourley)

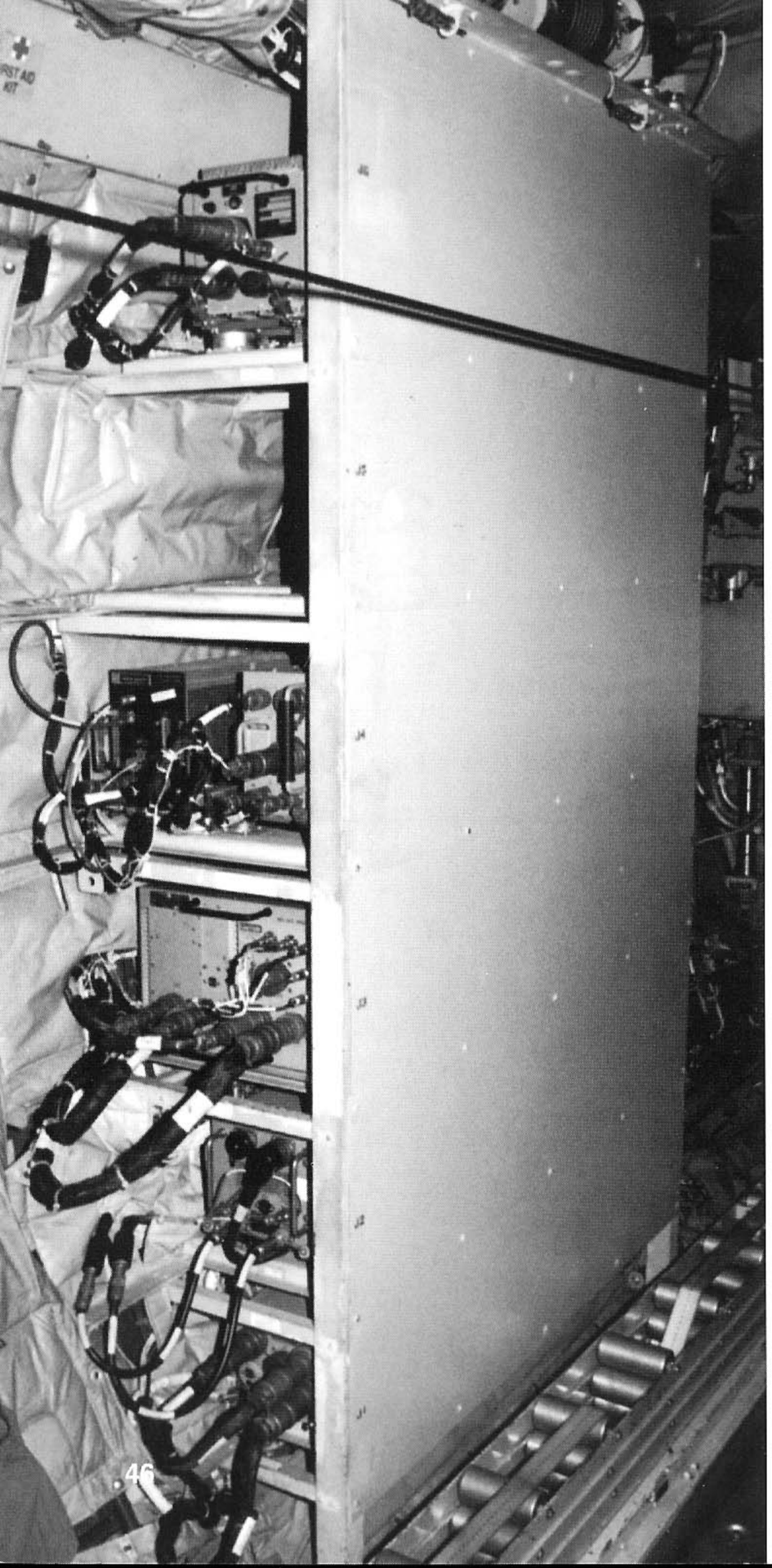
(Above) This vicious bat superimposed on the moon adorns the nose of an MC-130H COMBAT TALON II (83-1212). This creature is an apt metaphor for the special operations aircraft, which normally operate at night. (John Gourley)



(Above Right) Four large Multi Function Displays (MFDs) dominate the MC-130H main instrument panel. The port MFD in each pair displays all attitude and flight conditions, while the starboard screen presents radar and/or horizontal situation data. Two columns of conventional analog instruments are relegated to the center, just to port of the engine instruments. The instruments for each engine are (from top): torquemeter, tachometer, turbine inlet temperature indicator, fuel flow gauge, oil temperature gauge, oil pressure gauge, oil quantity gauge, and oil cooler flap position indicator. The center console is dominated by the four throttle levers (port) and the four engine condition levers (starboard). Primary flight deck colors are Dark Gull Gray (FS36231) and Instrument Black (FS27038), with a cockpit floor that appears to be a dark red (approximately FS30109). (John Gourley)

(Right) The Navigator and Electronic Warfare Officer (EWO) round out the MC-130H COMBAT TALON II's four-man crew. They sit at this console facing the starboard wall of the flight deck behind the co-pilot. Four MFDs – two each for the Navigator and EWO – present easy to access information needed in their duties. They use the two joysticks mounted on the counter to guide various sensors, including the FLIR turret in the nose. (John Gourley)

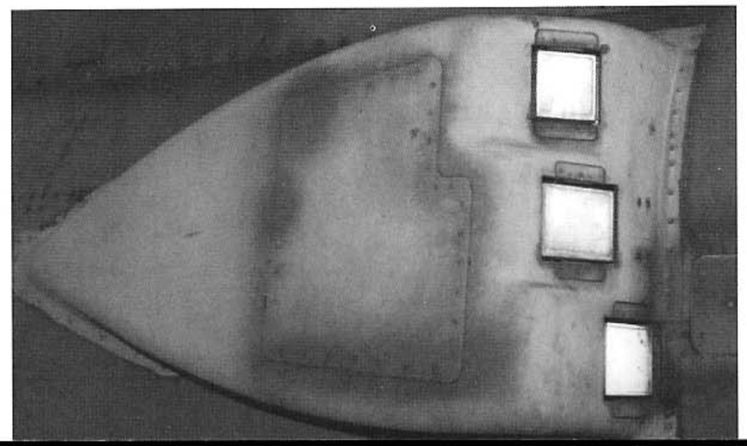




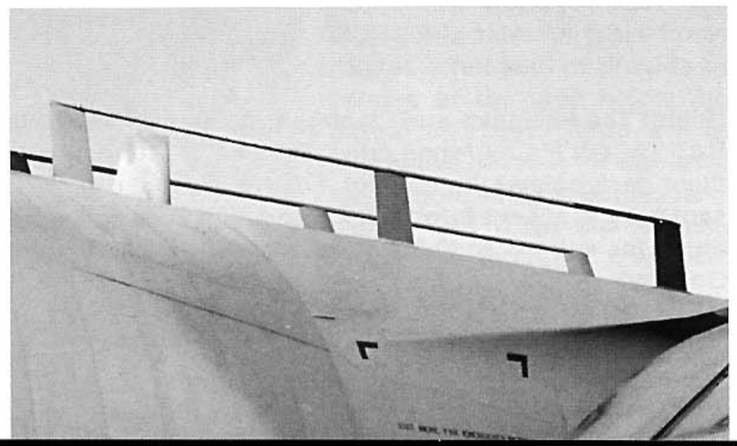
(Above) A Cincinnati Electronics AN/AAR-44 Missile Launch Warning System (MAWS) is mounted on the MC-130H's undersurface, between the main landing gear wheels. This passive IR system warns the crew of Surface-to-Air Missiles (SAMs) heading their way. The MAWS turret spins a full 360° to watch for SAM heat plumes. (John Gourley)

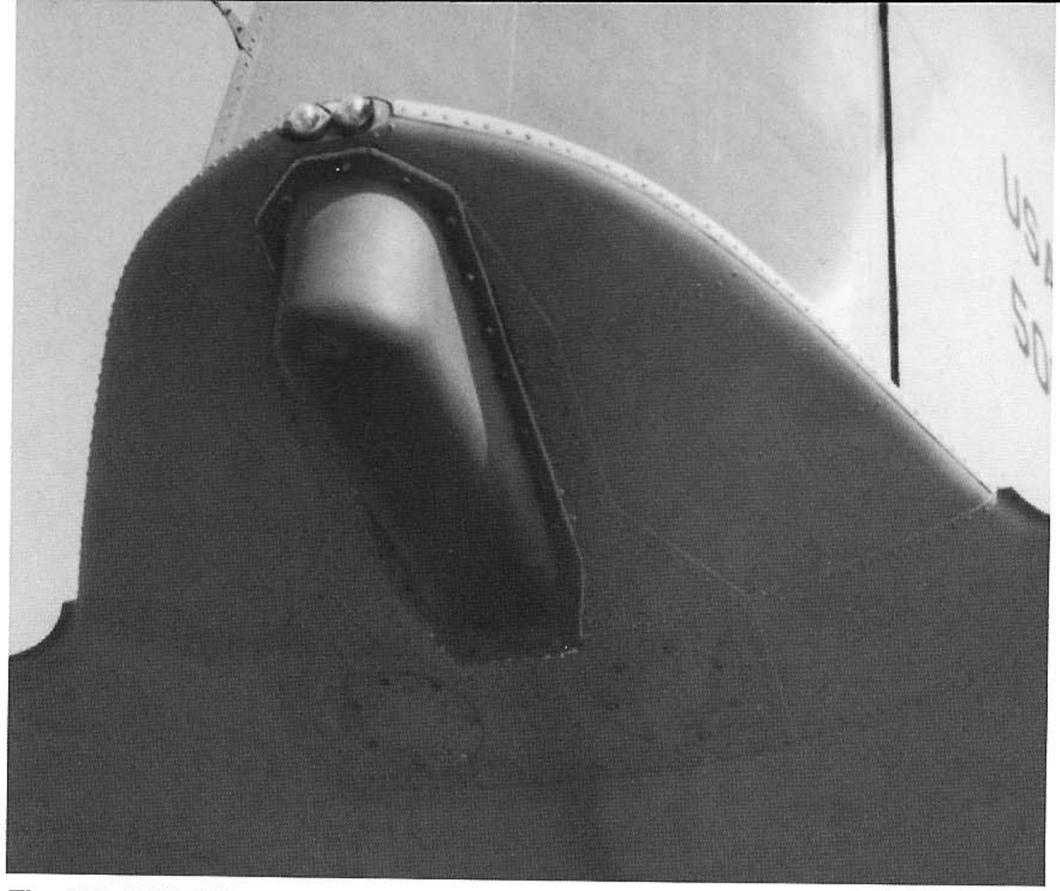
(Left) The MC-130H's starboard avionics rack is shielded from the cargo area. These items are organized into Line Replaceable Units (LRUs), which can be easily removed for maintenance and replacement. Black cords connect the LRUs to various sensors and instruments. (John Gourley)

General Electric AN/ALQ-172 radar detectors and noise jammers are located on the MC-130H's landing gear sponson aft sections. This device is mounted on the port side of 84-0475 in May of 1997. The AN/ALQ-172 detects the presence of enemy radars and generates noise to render them ineffective. (John Gourley)



Two Long Range Navigation (LORAN) antennas are mounted atop the fuselage near the wing trailing edge. LORAN is a low frequency navigation system originally developed for marine use, but widely adapted to aircraft. The MC-130H is equipped with LORAN and two other navigation systems with world-wide capability: GPS and Inertial. (John Gourley)





The MC-130H COMBAT TALON II's tail section is further simplified and streamlined over that installed on the earlier MC-130E COMBAT TALON I. Some of this is due to moving many RWR antennas from the tail cone to the vertical fin top. A AN/ALR-69 RWR is mounted in a fairing under the tail. This is an improvement of the earlier AN/ALR-46. Two white navigation lights are fitted to the tip and complement the red port and green starboard wingtip lights. (John Gourley)

One of three YMC-130H CREDIBLE SPORT aircraft (74-1686) is displayed at Warner Robbins AFB Museum in Georgia. In 1980, the USAF launched CREDIBLE SPORT to develop a C-130 that could land and take off in a short distance. It was intended for a second attempt to rescue US Embassy hostages in Iran, after the failure at Desert One on 24 April 1980. Four 80,000 pound thrust retro rockets were fitted in the forward fuselage and 180,000 pound thrust take off assist rockets were mounted under the tail. One YMC-130H successfully launched from the test distance, but crashed attempting a landing within the same place. CREDIBLE SPORT was soon cancelled and the hostages were released on 20 January 1981. (Ron Leonard)

The second HC-130H (64-14853) taxis at an unknown air base. The HC-130 series was originally ordered in 1964, and initially served in the rescue and recovery role exclusively. They assumed the refueling role during the Vietnam War, serving as range extenders for Sikorsky HH-3 and HH-53 Jolly Green Giant rescue helicopters. The HC-130s had a modified radome and were originally fitted with Fulton STAR recovery equipment, which was later removed. A large fairing on the upper fuselage housed the Cook AN/ARD-17 Aerial Tracker, which homed in on rescue beacons carried by downed airmen. A large observation window was located on both the port and starboard fuselage sides, while communications antennas were fitted on the lower forward fuselage. Refueling pods for helicopters were mounted on the outboard wing undersurfaces and 1360 gallon (5148.1 L) fuel tanks were placed inboard.

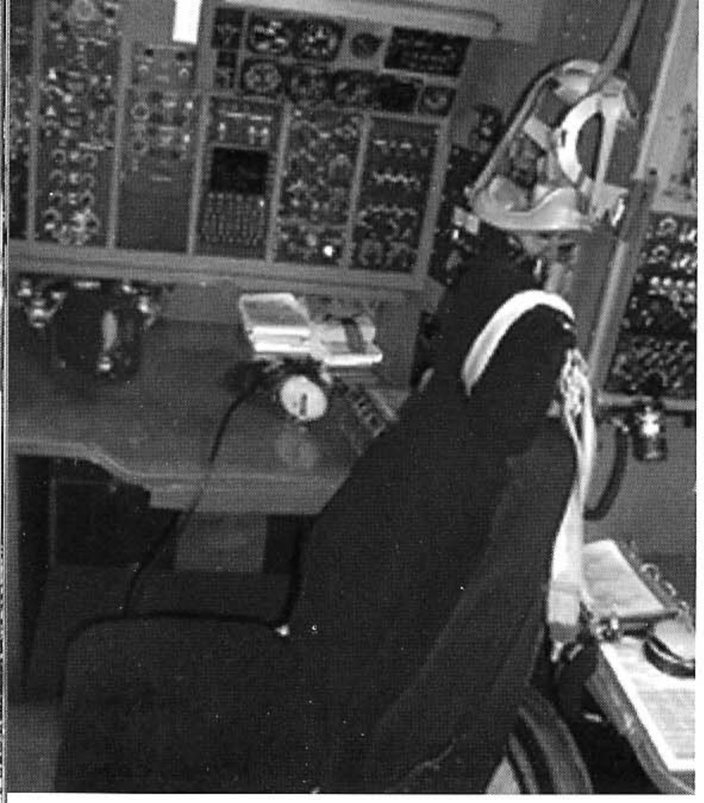
An HC-130H of the 55th Aerospace Rescue and Recovery Squadron (ARRS) refuels a 1st SOW HH-53 PAVE LOW helicopter near Eglin AFB, Florida on 31 August 1983. The Hercules trails two hoses from their wing pods, with each hose ending in a drogue. The HH-53's extended refueling probe has engaged one of the drogues to take on fuel. In 1986, Air Force Special Operations Command (AFSOC) achieved major command status and assumed control of both rescue and special operations assets. (USAF via Ron Leonard)

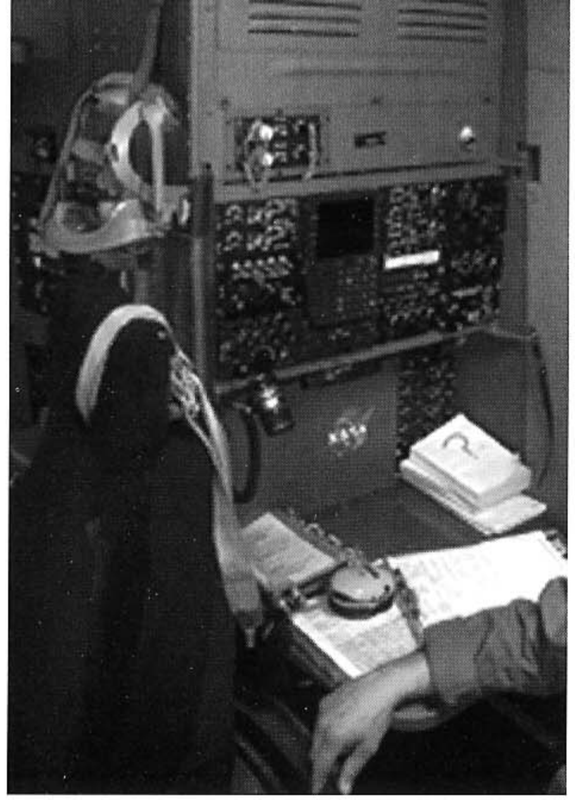
An HC-130P (66-0221) extends both refueling hoses while flying off the US Pacific coast in April of 1977. This Hercules was assigned to the 129th Aerospace Rescue and Recovery Group (ARRG), California Air National Guard (ANG). The Group flew from Hayward Airport between 1975 and 1980, then it moved to Moffett Field (now Moffett Federal Airport). The 129th ARRG was redesignated the 129th Air Rescue Group in 1989 and became the 129th Rescue Wing (RQW) three years later. The HC-130P is painted overall ADC Gray (FS16473), with wingtip and aft fuselage bands in Orange Yellow (FS13538) trimmed in Glossy Black (FS17038). RESCUE is white on an Insignia Blue (FS15044) tail band. These high visibility markings spoke to the HC-130 force's limited mission at the time. (USAF via Ron Leonard)

An HC-130P COMBAT SHADOW (66-0224) is parked at Fort Lauderdale International Airport, Florida in May of 2001. The HC-130P is similar to the earlier HC-130H, but was equipped from the outset for aerial refueling of helicopters. HC-130Ps deploy worldwide to provide Search And Rescue (SAR) coverage for US and allied forces. The mission includes low-level penetration of enemy territory under cover of night to deploy pararescue personnel and/or refuel SAR helicopters. (Lou Drendel)

An HC-130N (65-0983) of the 129th Rescue Squadron (RQS), 129th RQW, California ANG sits on the tarmac at Van Nuys Airport, California on 20 August 1993. This variant had minor equipment changes from the HC-130H and was intended for Combat Search And Rescue (CSAR) duties. The Fulton Surface To Air Recovery (STAR) device has been deleted from this aircraft. (Ted Carlson/Fotodynamics)

The first WC-130H (64-14861) flies over some low clouds. It was assigned to the 54th Weather Reconnaissance Squadron (WRS) at Andersen AFB, Guam. The Military Airlift Command (MAC) patch has been added to the aft fuselage, near the national insignia. The USAF has flown the 15 WC-130Hs and earlier WC-130Es on weather reconnaissance missions. This Hercules is similar to the HC-130, but is modified for penetrating hurricanes and typhoons. WC-130s fly into these severe storms to collect meteorological data, which gives forecasters warning data. This mission is now flown by the 53rd WRS of the Air Force Reserve Command (AFRC), known as the 'Hurricane Hunters.' It is the only Department of Defense organization still flying into tropical storms and hurricanes, a unique mission it has performed since 1944. Their ten WC-130s and crews are assigned to the 403rd Wg at Keesler AFB, Mississippi. (USAF)





(Above Far Left) The HC-130P's navigator occupies this station on the flight deck, aft of the co-pilot and facing starboard. He monitors navigational data from the Hercules' sensors and plots the course for reaching the downed person or persons. The navigator relays this information to the rescue helicopter's pilot and to ground stations. His chair is thickly padded for added comfort during long-endurance flights. (Lou Drendel)

(Above Near Left) The radio operator's station on the HC-130P replaced crew rest bunks on standard Hercules transports. This crewman monitors rescue radios used by downed airmen and transmits information to the rescue helicopters. An emergency oxygen mask hangs from the radio console near the navigator's seat. The National Aeronautics and Space Administration (NASA) insignia is believed to be a 'zap' mark from a visiting NASA unit. (Lou Drendel)

(Above) The HC-130 instrument panel is similar to the standard C-130H panel, but three rescue tracking instruments replace the station keeping radar indicator atop the instrument panel on Hercules transports. Approach plates are clipped to both control yokes for ready reference during instrument approach procedures. (Lou Drendel)

(Left) The nose landing gear steering wheel is mounted to port of the HC-130's instrument panel. The pilot uses this wheel for taxiing below airspeeds using the control surfaces. An oxygen regulator and controls for lighting and intercom systems are placed atop the side console. Circuit breakers are mounted on the console's side. (Lou Drendel)

(Above) An 1800 gallon (6813.7 L) auxiliary fuel tank is loaded into the cargo hold of an HC-130. This supplies fuel for in-flight refueling of special operations helicopters. Fuel is pumped from this tank to wing-mounted refueling pods, whose hoses supply fuel to the helicopter's refueling probe. (Lou Drendel)

(Above Right) The HC-130's refueling basket, hose, and drogue are contained in this 934 pound (423.7 KG) pod. A 91 foot (27.7 M) long hose is extended towards the receiving aircraft. Fuel is transferred at a rate of 300 gallons (1135.6 L) per minute. The airspeed refueling envelope is 150 to 270 knots (172.7 to 310.9 MPH/278 to 500.3 KMH). (Lou Drendel)

(Right) An HC-130H believed to be serialed 64-14852 taxies at an unidentified air base. This Hercules was assigned to an Air Force Reserve (AFRES) unit during the 1980s and early 1990s. Refueling pods are mounted under the outboard wing surfaces, while 1360 gallon (5148.1 L) fuel tanks are mounted between the engine nacelles. Fulton STAR equipment has been removed from the nose. It is camouflaged in the 'European I' overall scheme of Dark Green, Gunship Green, and Gunship Gray, with black markings. (John Gourley)

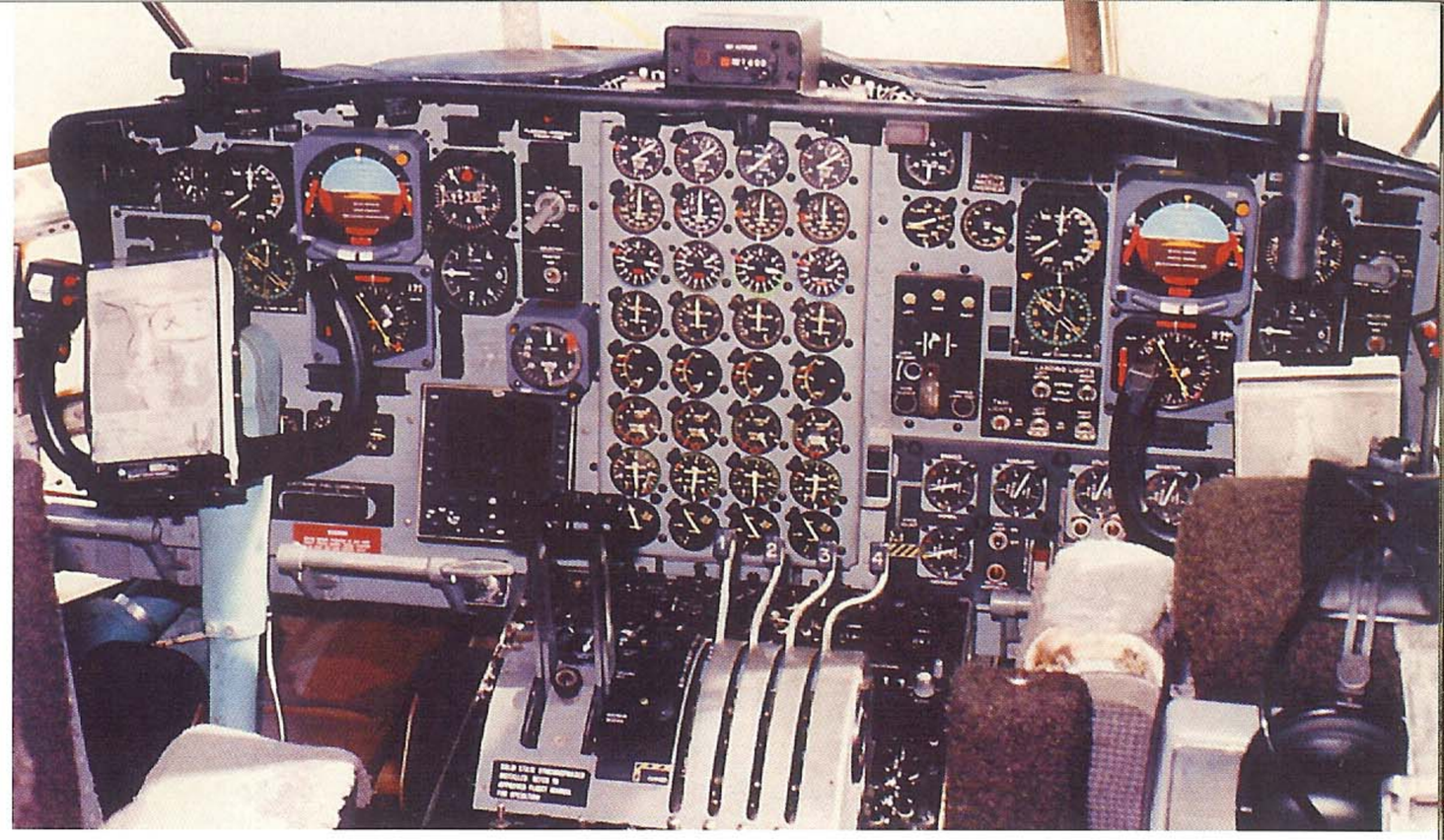
SSgt Jorge Garcia, an HC-130P COMBAT SHADOW loadmaster (left), and SSgt Tim Dodge, crew chief, monitor engine start at an operating location supporting Operation SOUTHERN WATCH. Since the spring of 1991, this operation enforces the southern no-fly zone in Iraq. COMBAT SHADOW aircraft assist in air strikes against Iraqi anti-aircraft batteries that regularly fire on US and British patrol aircraft. This Hercules (65-0983) is the first HC-130H built and was later upgraded to HC-130P standard. (USAF Photo by MSgt Dave Nolan)

This HC-130P (MY/64-14852) is assigned to the 71st RQS, 347th Wg at Moody AFB, Georgia. This Wing also flew Lockheed Martin (General Dynamics) F-16 Fighting Falcon fighters and Fairchild Republic A-10 Thunderbolt II attack aircraft. This Wing is now the 347th RQW, devoted to CSAR duties with HC-130s and Sikorsky MH-60 PAVE HAWK helicopters. The Hercules is painted overall AMC Proud Gray (FS26173), with low visibility markings. The blue tail band indicates the 71st RQS. The Air Combat Command (ACC) insignia on the vertical tail is painted in subdued colors. (USAF)

A US Coast Guard (USCG) HC-130B (1348) is parked at Coast Guard Air Station (CGAS) San Francisco, California. This variant was similar to the USAF's C-130B, but incorporated SAR equipment. It was originally designated R8V-1G, then SC-130B before becoming HC-130B. The USCG received 12 HC-130Bs from 1960 and these served until the early 1980s. (Bill Dunning)

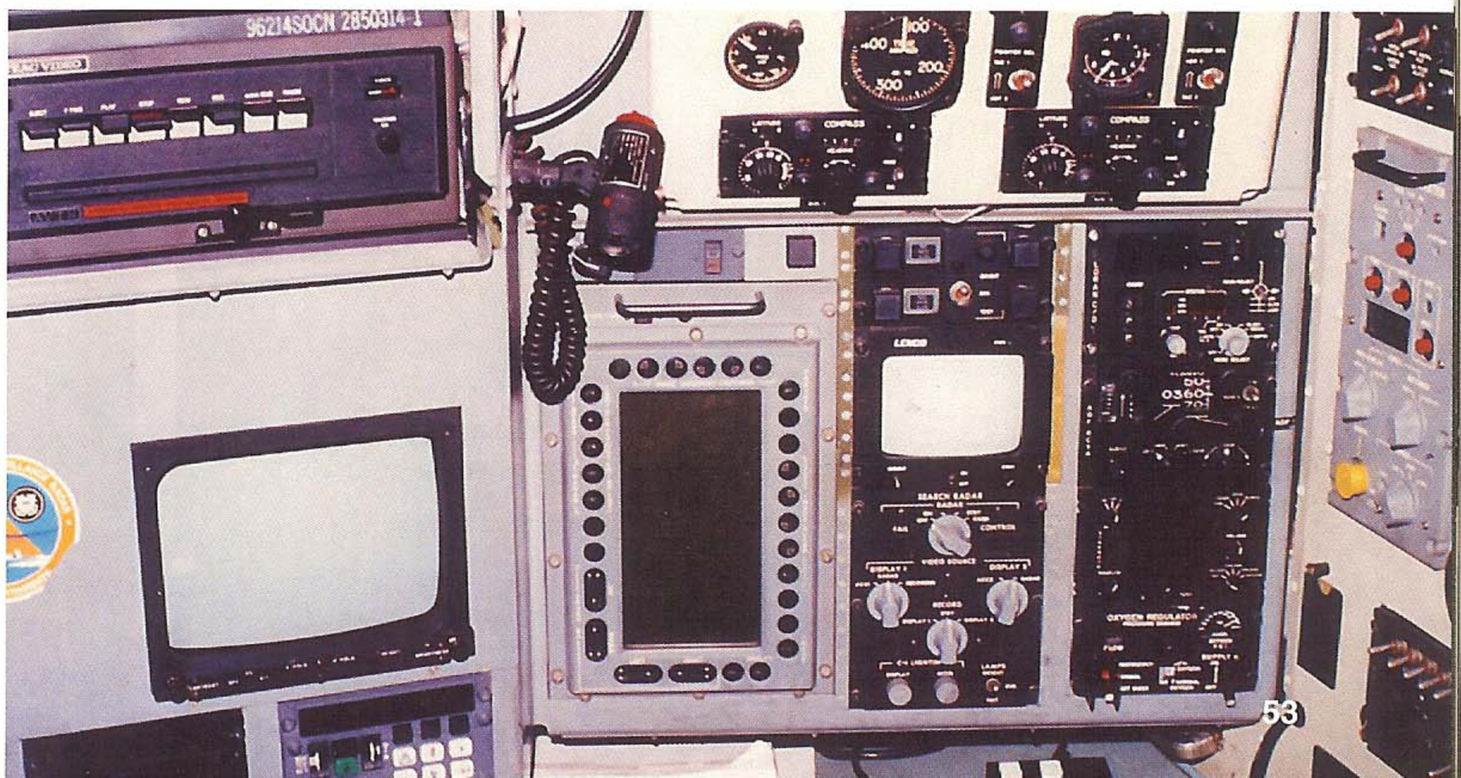
A USCG HC-130H (1716) taxies at an unidentified airfield. Lockheed delivered 18 aircraft in the early 1970s and 11 similar HC-130H-7s in the early 1980s. USCG Hercules are employed on SAR, drug traffic interdiction, fishery patrol, and iceberg spotter patrol duties. This aircraft is painted overall white with red panels. (John Gourley)

The sole EC-130V (1721) rests on the tarmac at Edwards AFB, California on 18 October 1996. Developed as a proof of concept aircraft in 1992, it combined a C-130H airframe with the Grumman E-2 Hawkeye's Lockheed Martin AN/APS-125 radar in a rotodome above the fuselage. The USCG originally employed the EC-130V on anti-narcotics patrols, but also used it for SAR duties. Budget cuts forced the USCG to transfer this Hercules to the USAF for testing in 1993. (Ted Carlson/Fotodynamics)



The Coast Guard's HC-130Hs have updated instrument panels. This panel includes a new all-attitude indicator (in light blue and black) in front of the control columns, with a horizontal situation indicator immediately below it. Updated main flight instruments are also included. A radar screen is mounted on the lower port panel section. (John Gourley)

The navigator radar station occupies the aft starboard flight deck of the USCG HC-130H. The crew member guides the Hercules to its objective using data from the nose-mounted AN/APS-37 radar and other flight instruments on the console. Video from cameras aboard the aircraft and trained on vessels in the water is displayed on a TV screen. (John Gourley)

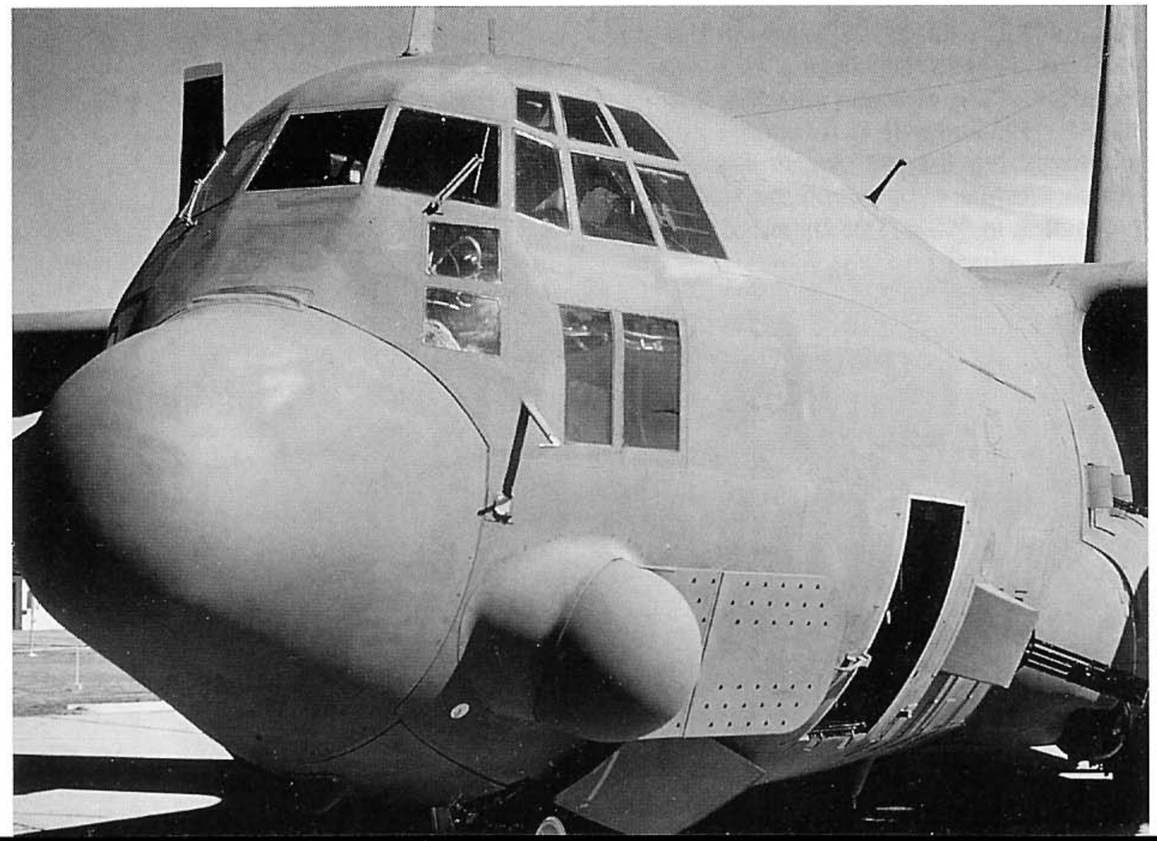


In 1967, the first C-130A (53-3129) was converted into an AC-130A Spectre gunship. It is now displayed at Hurlburt Field's museum in Florida. The first AC-130A (54-1626) entered combat in South Vietnam in September of 1967. Its combat evaluation was an unqualified success, since it was able to destroy communist supply trucks along the Ho Chi Minh Trail at a cost of $5100 each, versus the F-105 per truck cost of $118,000!

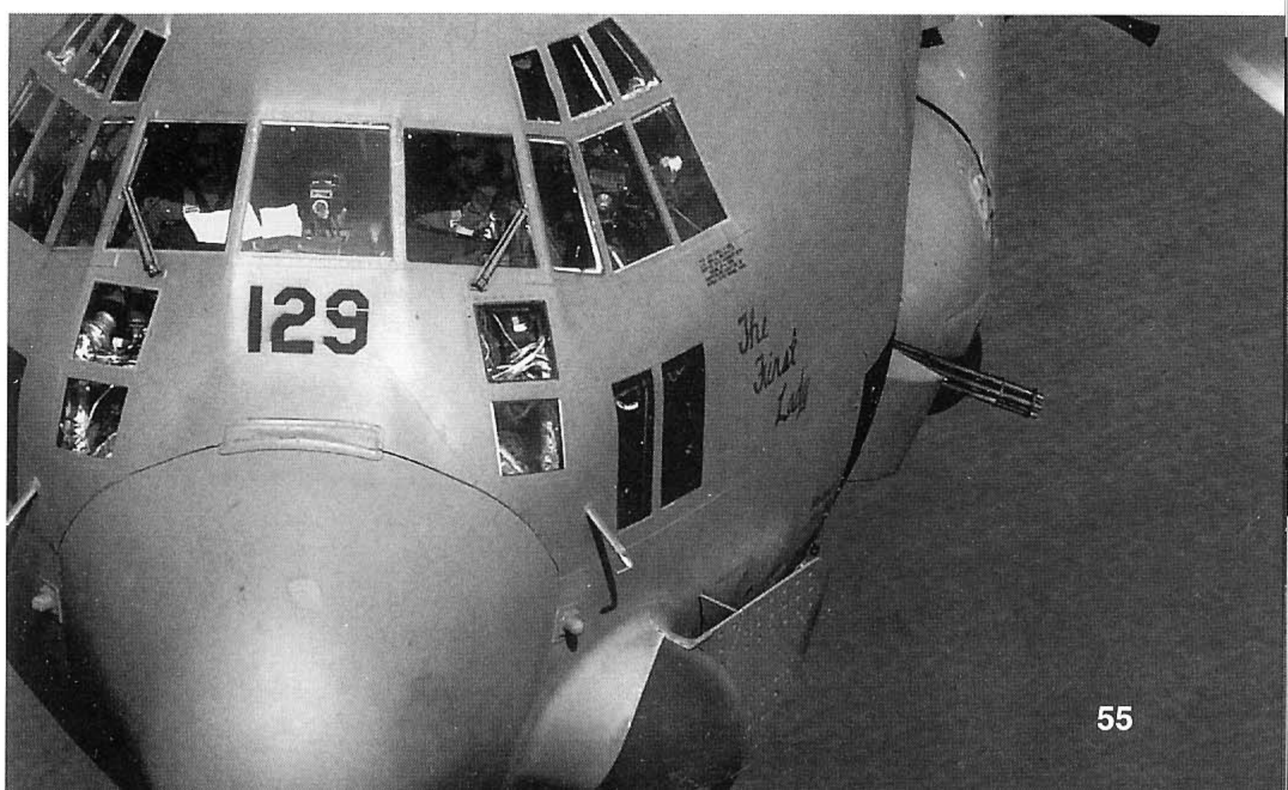
This AC-130A (55-0014) was assigned to the 711th Special Operations Squadron (SOS), an Air Force Reserve unit at Duke Field, Florida. The starboard side of this and other Hercules gunship variants is similar to standard C-130 transports. An air data probe is fitted to the starboard wing tip. (Ron Leonard)

The AC-130A *EXTERMINATOR* (54-1628) is parked at its Southeast Asia (SEA) base. These gunships were primarily used for interdicting the Ho Chi Minh Trail in Laos and Cambodia. The AC-130A is painted with Glossy Black sides and undersurfaces, with upper surfaces in the SEA camouflage of Dark Green, Medium Green, and Tan. A AN/ASQ-24A stabilized tracking set is mounted in the crew access doorway.

The large nose radome housed the Sperry AN/APN-59B navigation and moving target indicator radar. The smaller radome on the port side enclosed the AN/ASD-5 BLACK CROW sensor. This passive sensor detected the radiation emitted by unshielded truck ignition systems and relayed the vehicle's direction to the gunship crew.



(Above) An AC-130A (53-3129) flies over the ocean during a training mission in the early 1990s. In 1969, the USAF proposed and approved of an improved Spectre. This was armed with two General Electric (GE) 20MM M61 Vulcan cannon and two 40MM Bofors M2A1 Modified (L60) cannon. These replaced the original Spectre armament of four GE 7.62MM MXU-470 Miniguns and four 20MM M61s. Targeting was improved through the installation of a two kilowatt (kW) AN/AVQ-17 illuminator in the aft port fuselage and a Westinghouse AN/AVQ-23A PAVE SPIKE laser designator. A target database could be stored in the Inertial Navigation System (INS). Dubbed SURPRISE PACKAGE, the upgraded Spectres improved the truck-killing rate to better than seven per sortie. (USAF via Ron Leonard)

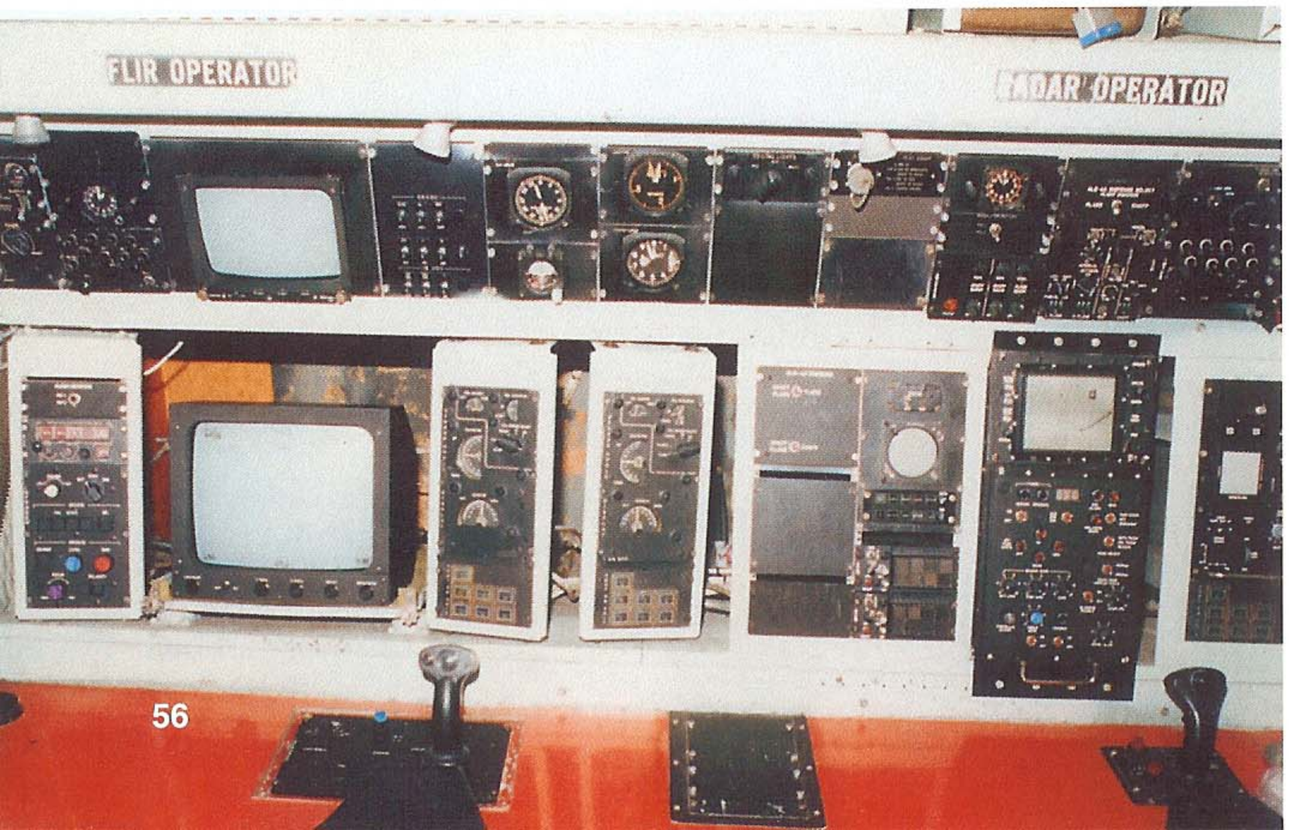


(Right) The first AC-130A (53-3129) was the oldest Hercules in service and was appropriately named *The First Lady*. Early Spectres were equipped with forward and side-looking radar, a Starlight Scope for night observation, and a computerized fire-control system linking sensors and guns. Overt and covert illuminators, armor plate, and upgraded navigation systems were also fitted to the aircraft, which were designated GUNSHIP IIs. (The Douglas AC-47 Spooky was the original Gunship.) (USAF via Ron Leonard)

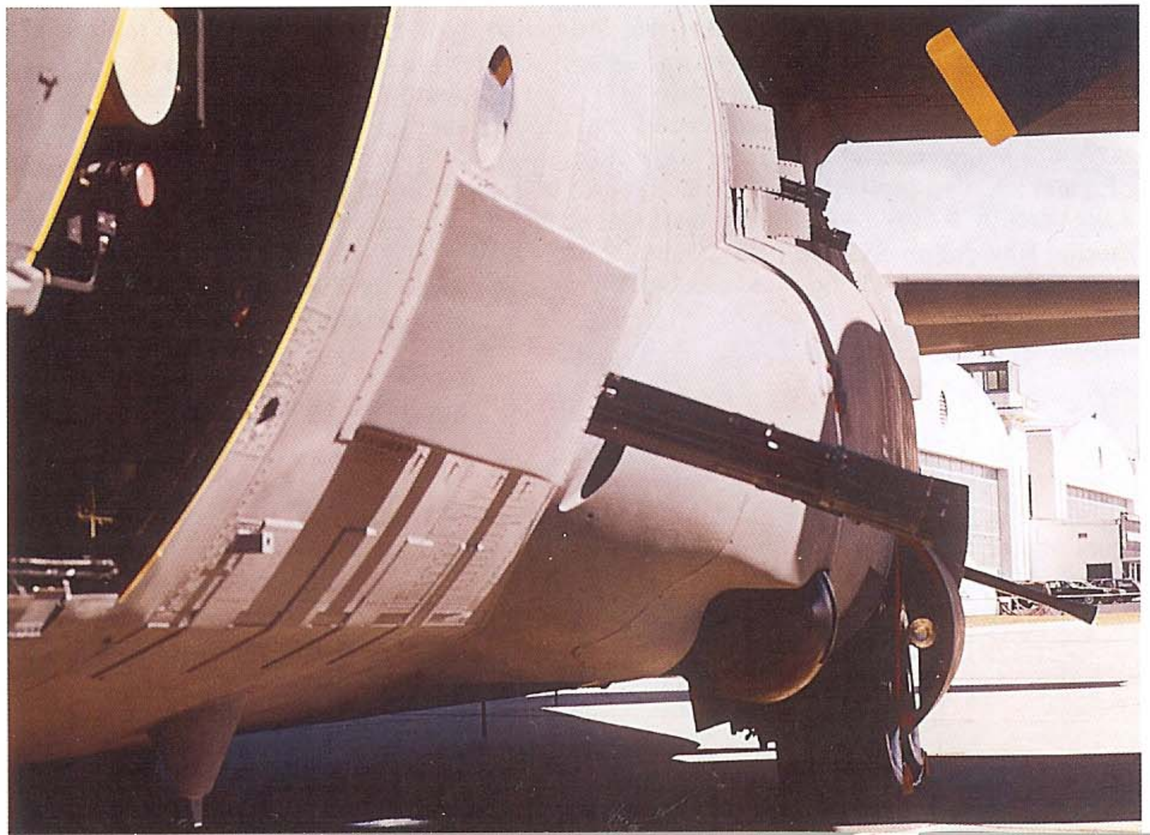
AZRAEL "Angel of Death" was an AC-130A (54-1630) which flew six missions during Operation DESERT STORM in 1991. This included attacking retreating Iraqi forces along the 'Highway of Death' from Kuwait City to Basra, Iraq. It was named for an angel in the Koran who severed the soul from the body. This Spectre is now displayed at the USAF Museum at Wright-Patterson AFB, Ohio. (John Gourley)

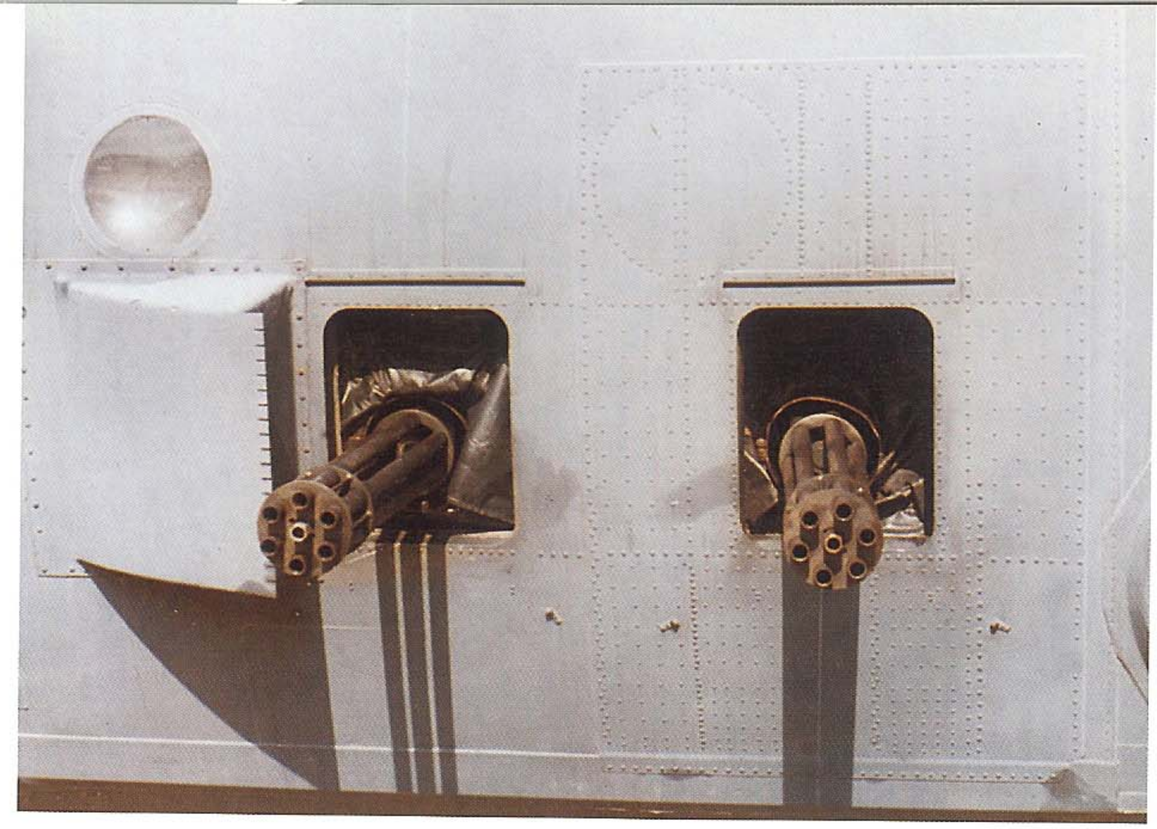
Another DESERT STORM veteran was this AC-130A (55-0014). It has 21 mission markings – camels – from that conflict painted on the nose. Above these tallies is the Spectre insignia – a skeleton firing a Minigun from a crescent moon. This aircraft is displayed at the museum at Warner Robbins AFB, Georgia. (John Gourley)

Two of the AC-130A's 13-man crew sit at this forward-facing console in the mid-fuselage. The Forward Looking Infrared (FLIR) operator sits to port, with the radar operator beside him. The FLIR operator uses a joystick on the counter to maneuver the FLIR turret and views the images using the lower TV monitor. (John Gourley)



The AC-130A's original armament included a pair of 20MM cannon mounted on the lower fuselage ahead of the landing gear sponson. Two 7.62MM Miniguns are fitted above this fairing and a 40MM cannon is mounted aft of the sponson. Air deflectors are mounted immediately forward of the gun ports.



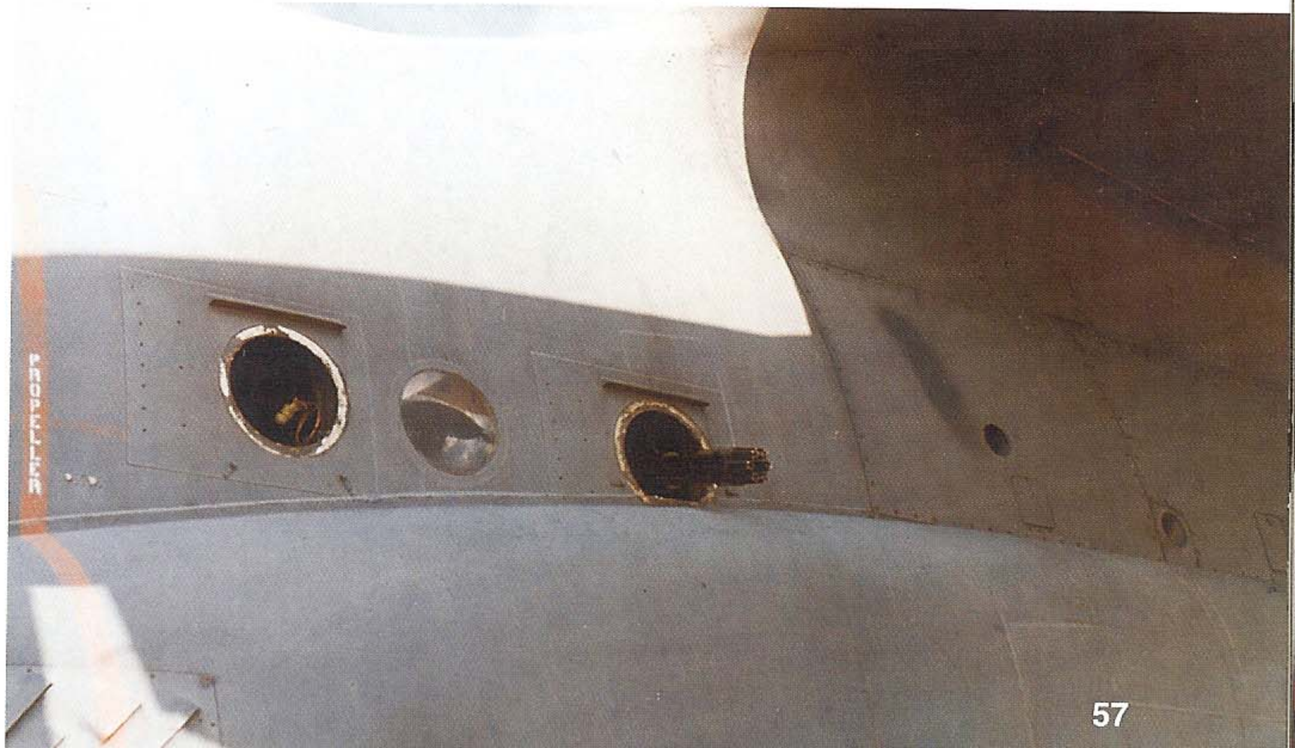


The six-barreled 20MM M61A Vulcan cannon is hydraulically driven and electrically fired. It has a selectable firing rate of either 4000 or 6000 rounds per minute (RPM). The M61 has a muzzle velocity of 3380 feet (1030.2 M) per second and an effective range of approximately 10,000 feet (3048 M).

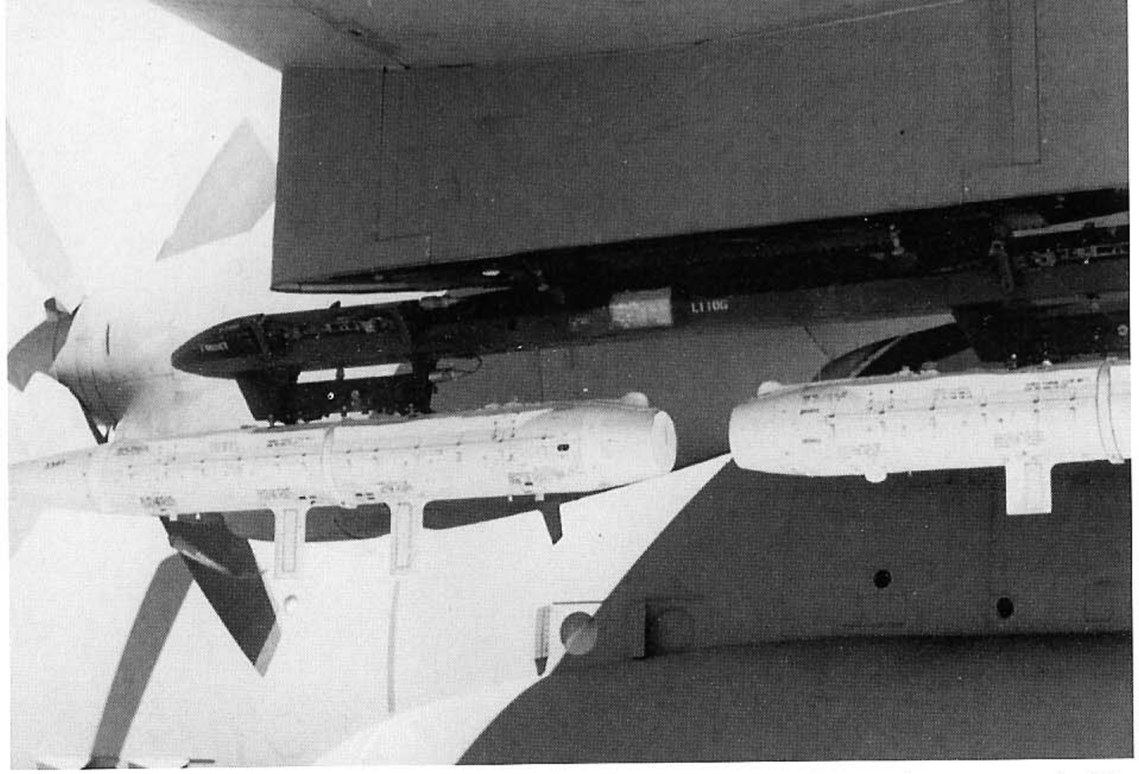
The original AC-130A had enlarged wheel well sponsons compared to other Hercules variants. An exhaust port for the Gas Turbine Compressor (GTC) is located immediately forward of the gear doors. The white landing light is mounted on the forward edge of the main gear door. (Damon Blair)

A turret-mounted Texas Instruments AN/AAD-4 FLIR is mounted on the front area of the AC-130A's port landing gear sponson. This device collects a heat signature image of the area in front of the sensor. The FLIR operator maneuvers the turret to obtain IR images of the target area from various angles.

The 7.62MM MXU-470 Miniguns are miniature versions of the 20MM Vulcan cannon. Two are mounted above the landing gear sponson. They fire the standard NATO .308 caliber round at either 4000 or 6000 RPM. The MXU-470 has a muzzle velocity of 2850 feet (868.7 M) per second and an effective range of 5000 feet (1524 M).

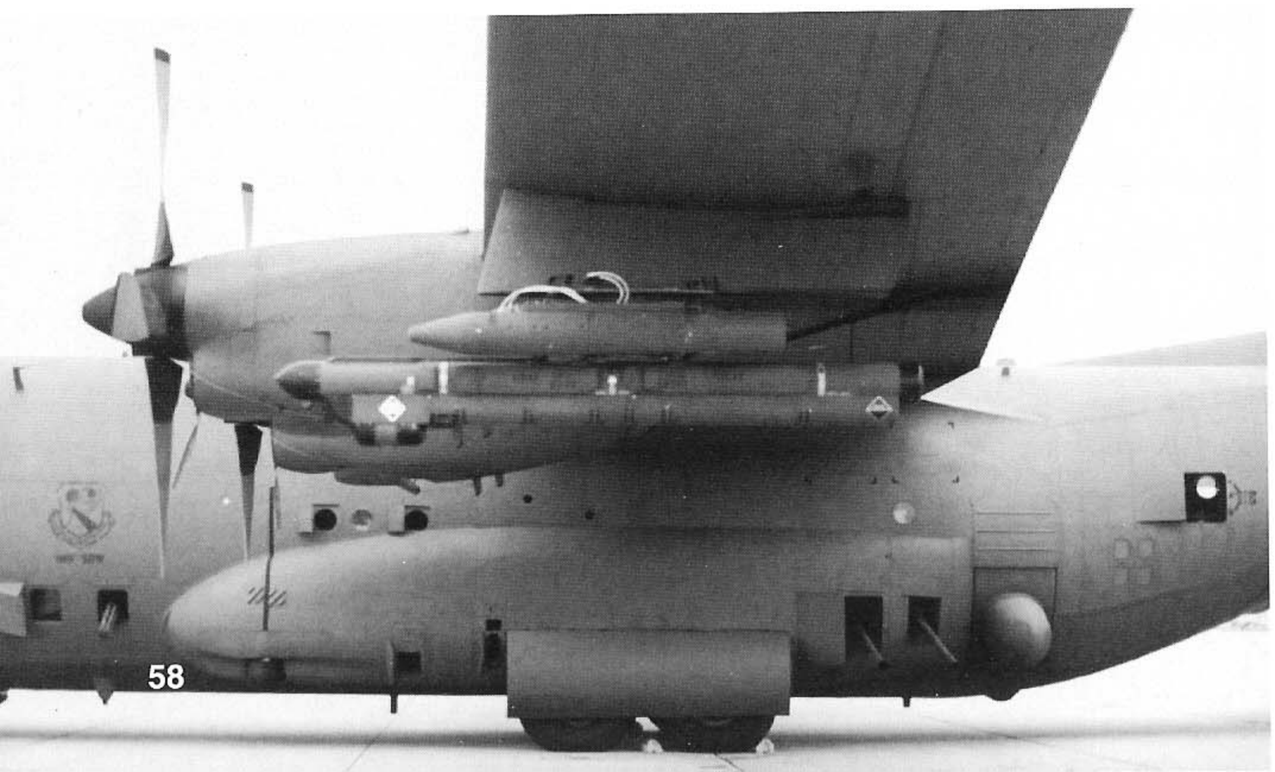


Two primary countermeasures pods are mounted on the AC-130A's port outboard pylon. The upper device is a Hallicrafters AN/AAQ-8 IR countermeasures pod. Below the AN/AAQ-8 is a Westinghouse (now Northrop Grumman) AN/ALQ-131V Electronic Countermeasures (ECM) pod. The latter item is a broadband noise/deception jamming pod used on many current and recent USAF aircraft. (John Gourley)

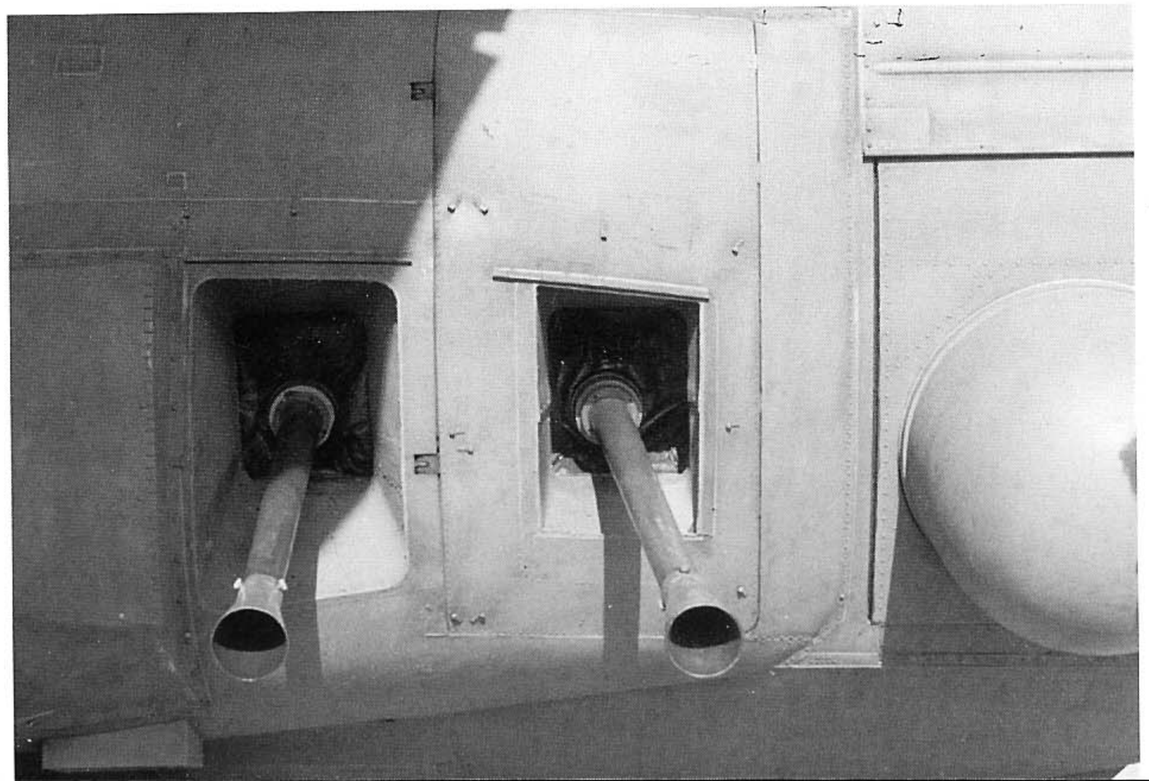


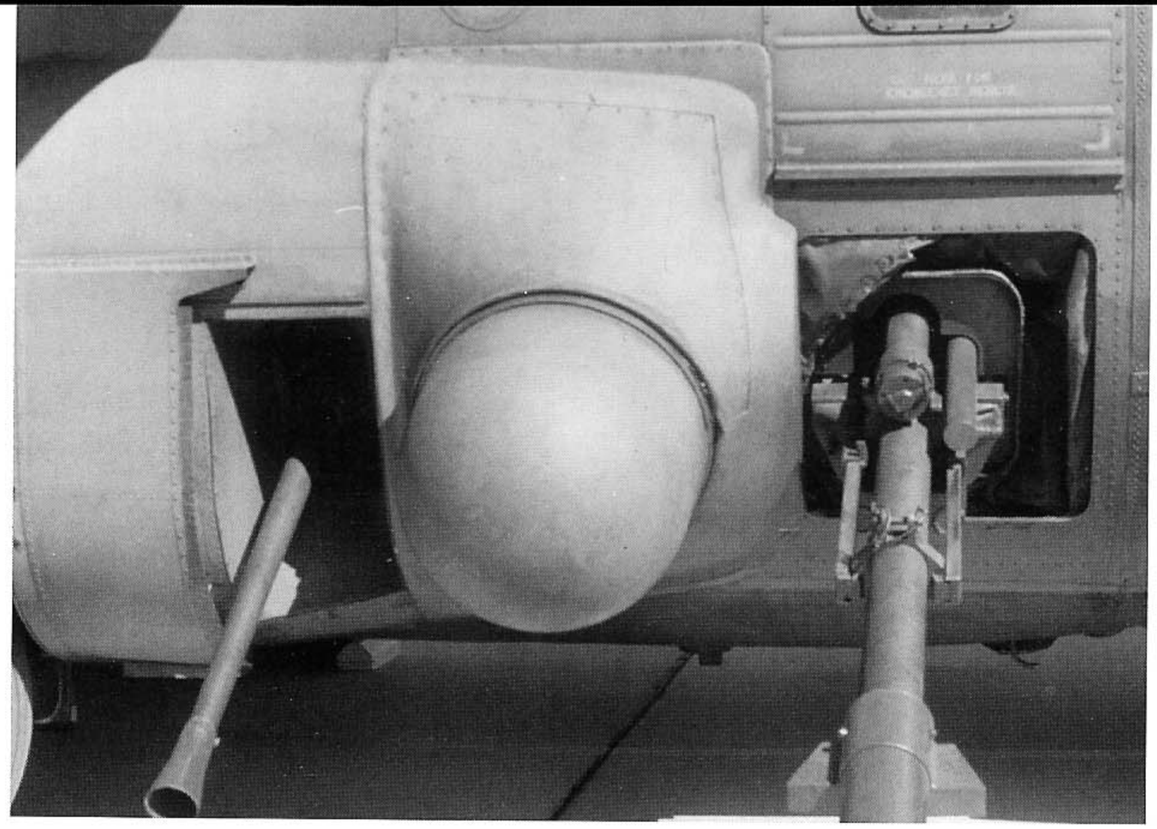
Two GE AN/ALQ-87 Frequency Modulation (FM) Barrage jamming pods are mounted in tandem under the port wing of an AC-130A. The pods are hooked up to a Multiple Ejector Rack (MER), which is mounted on the port outboard wing pylon. The AN/ALQ-87 equipped AC-130As and US fighters flying over Vietnam during the late 1960s.

A Westinghouse (now Northrop Grumman) AN/ALQ-119 noise/deception jamming pod is mounted under an AN/AAQ-8 IR countermeasures pod on this AC-130A. This S/X/C-Band pod was also used on F-4, F-111, A-7, F-16, and A-10 aircraft until replaced by the later AN/ALQ-131. The AN/ALQ-119 also went under the code names COMPASS TIE, COMPASS MATRIX, and SEEK ICE. (John Gourley)



In 1969, AC-130As were equipped with two 40MM M2A1 Modified cannon under the SURPRISE PACKAGE program. The two weapons were mounted on the port fuselage in the aft main landing gear sponson. A Motorola AN/APQ-133 beacon tracking radar is mounted in a radome aft of the cannon. (Ron Leonard)

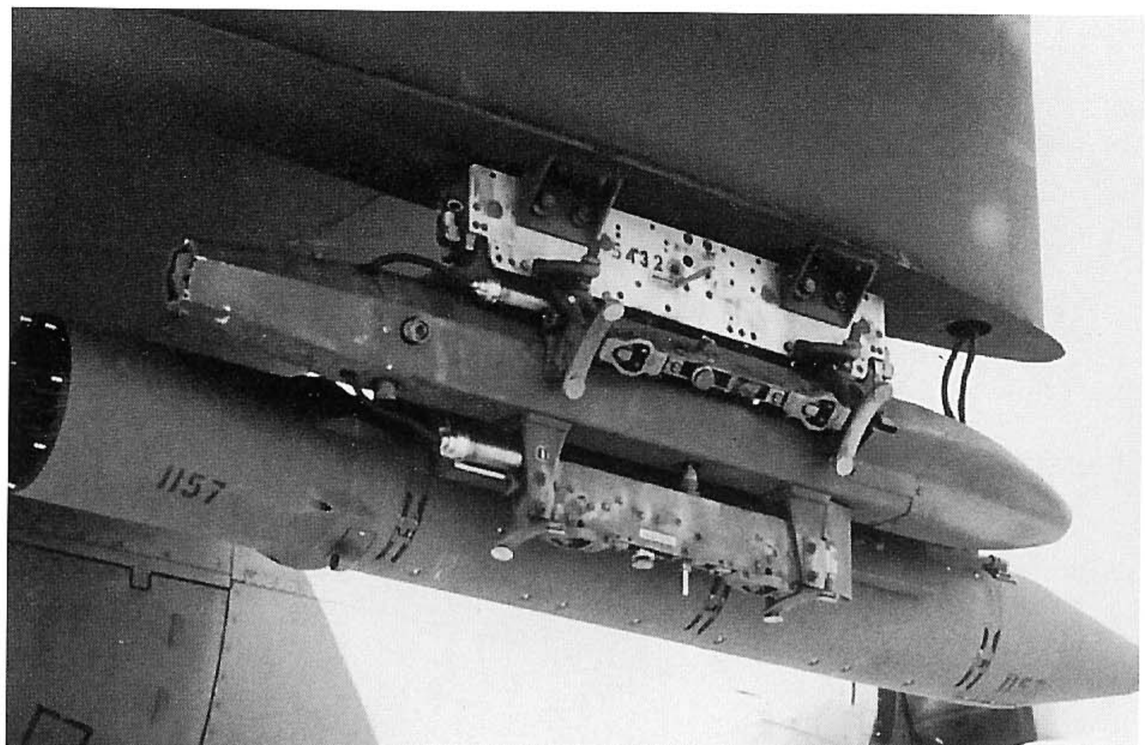




The USAF modified one AC-130A (55-0014) to carry a modified 105MM M102 howitzer in 1971. The M102 was mounted in the doorway, one of the 40MM cannon was removed, and the AN/APQ-33 radome moved beside the forward 40MM gun. The 105MM weapon was standardized on the AC-130E in 1972. (Ron Leonard)

One of 11 AC-130E PAVE SPECTRE Is (AH/69-6567) is prepared for a training mission from Hurlburt Field in 1969. This gunship was assigned to the 415th Special Operations Training Squadron (SOTS), 1st SOW. Four 3755 SHP T56-A-7 engines powered the AC-130E. The aircraft saw action against North Vietnamese forces in early 1972. (Bill Dunning)

An AN/AAQ-8 IR countermeasures pod is mounted onto a Triple Ejection Rack (TER) on the starboard outer pylon of an AC-130E (69-6575). The USAF used both TERs and larger MERs to secure countermeasures equipment onto the Spectres. The AN/AAQ-8 was sometimes replaced by jammer pods or by chaff pods to counter radar-homing missiles. (John Gourley)



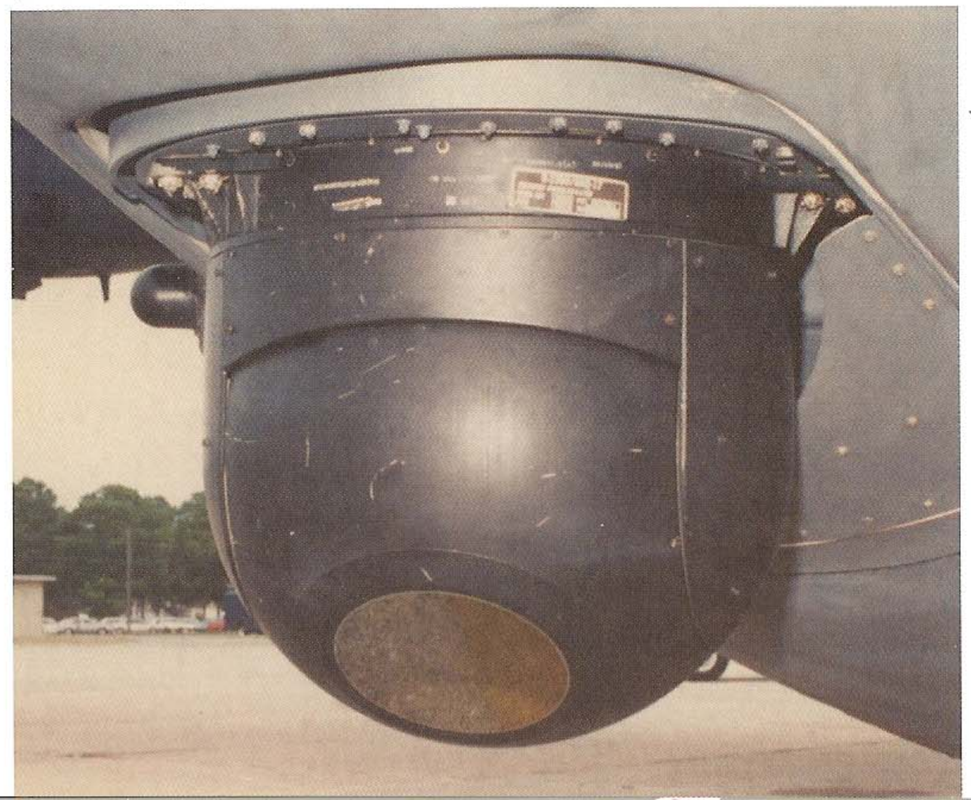
The USAF reengined the ten surviving AC-130Es with more powerful 4300 SHP T56-A-15 engines in 1973. In-flight refueling capability and upgraded avionics were also installed on the Spectres, which were redesignated AC-130Hs. This AC-130H (69-6575) was assigned to the 6th SOS at Hurlburt Field in June of 1978. (Grant Matsuoka)

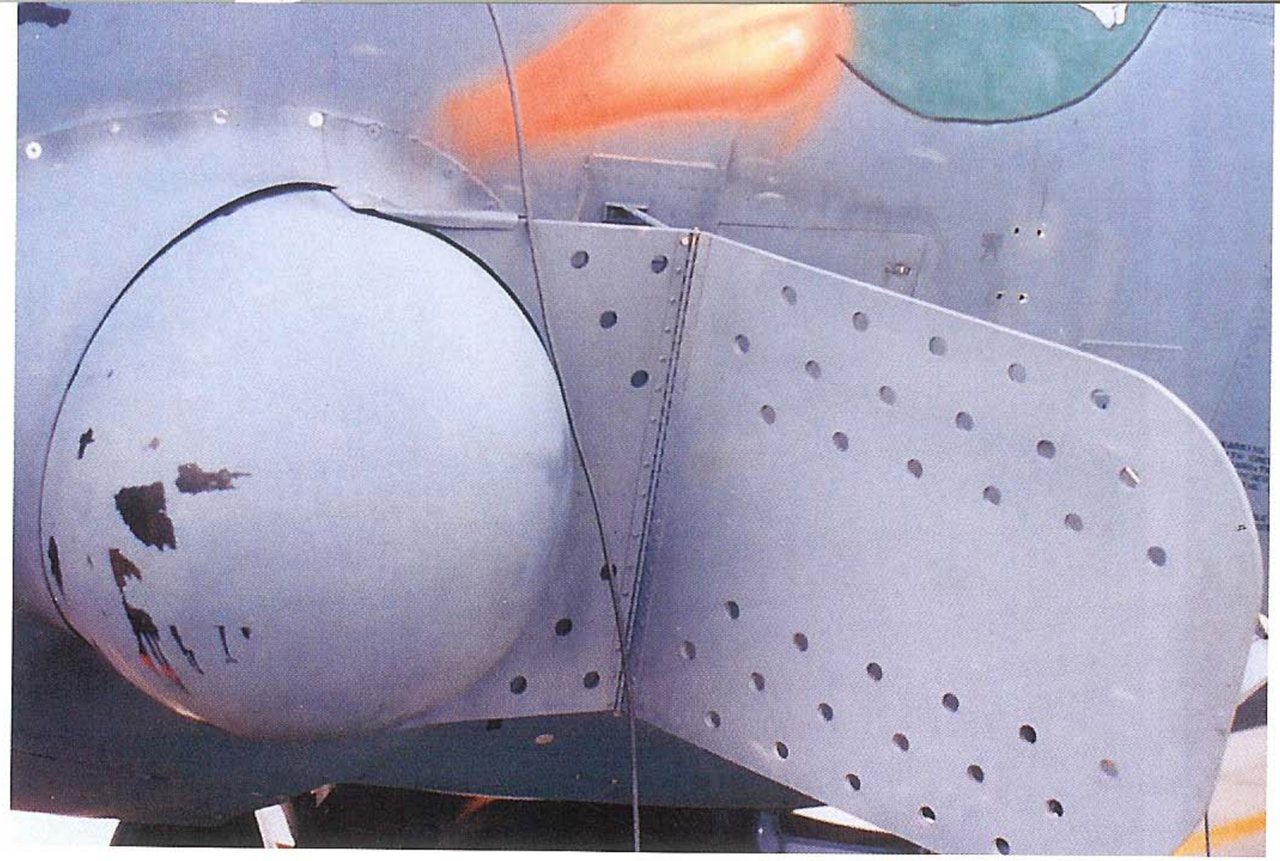
An AC-130H (69-6575) is parked at Hurlburt Field in July of 1992. The Spectres were painted overall Gunship Gray (FS36118) from the early 1970s, with most markings in black. The AC-130H carries a crew of 14 – five officers and nine enlisted men. (John Gourley)

This 16th SOS AC-130H (69-6572) is reflected in standing water on the Hurlburt Field ramp. It is painted in the revised AFSOC camouflage of Dark Ghost Gray (FS36320) over Gray (FS36492) adopted in the early 1990s. A Sikorsky MH-53J PAVE LOW III helicopter is parked near the Spectre.

Colorful Spectre artwork graces the nose of an AC-130H (69-6572) assigned to the 16th SOS, 1st SOW. In 1986, 1st SOW Spectres were modified with a Special Operations Force Improvements (SOFI) package. One of the principal external changes was the relocation of the AN/AAQ-17 FLIR turret from the port landing gear sponson to a position under the nose radome. (Ron Leonard)

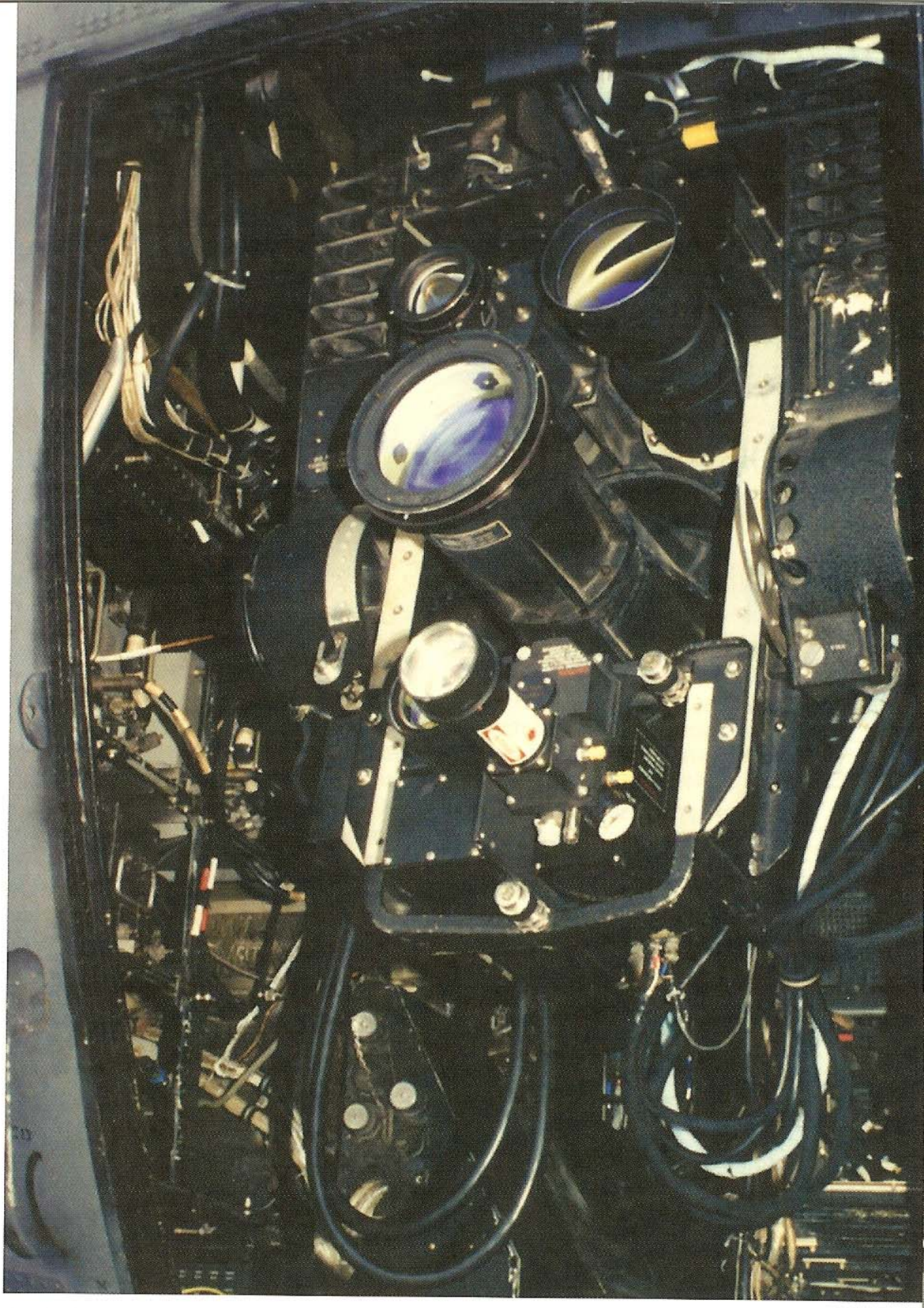
The Texas Instruments AN/AAQ-17 FLIR is mounted in a turret under the AC-130H's nose radome. This turret fully rotates 360° to gather infrared images of the terrain. This allows the Spectre's crew to navigate without using their radar, which can give their presence away to enemy forces. (John Gourley)



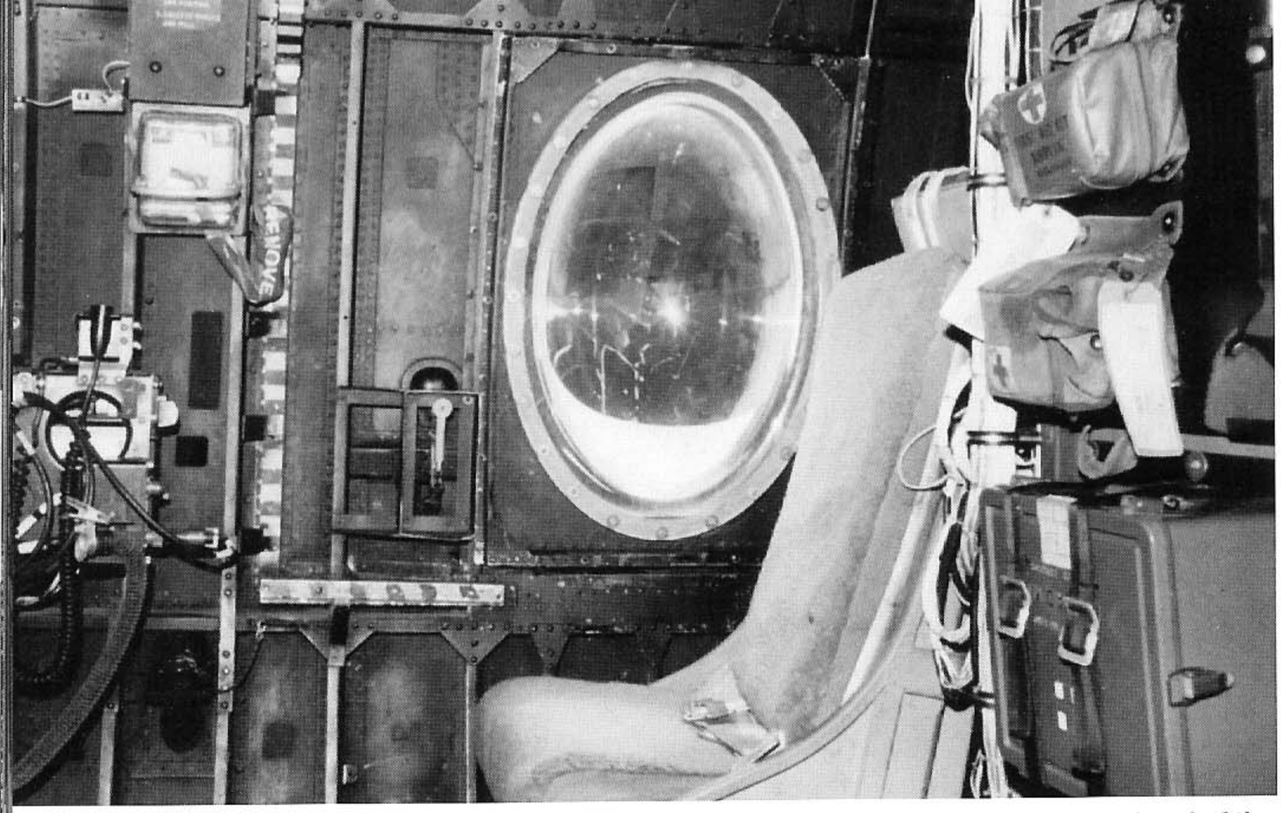


The AN/ASD-5 BLACK CROW direction finding ignition sensor is mounted in a radome on the AC-130H's port nose, immediately aft of the main radome. The folding air shield behind the BLACK CROW radome affords access to the battery compartment and the ground power socket. This shield deflected the airstream away from the AN/ASQ-24A tracking set located immediately aft of the shield. (John Gourley)

Additional mission-specific indicators and switches are located on the AC-130H instrument panel compared to panels on standard C-130H transports. The radar scope atop the instrument panel is removed and radar warning receivers are installed. The primarily black flight deck allows the pilots to fly using Night Vision Goggles (NVGs). (John Gourley)

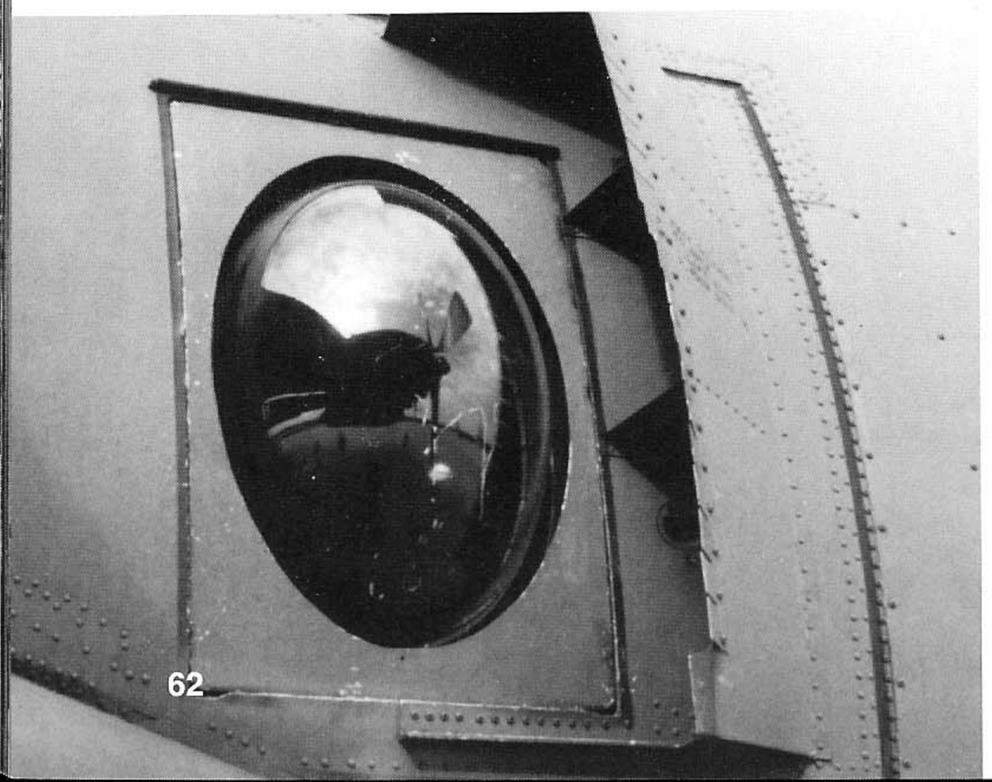


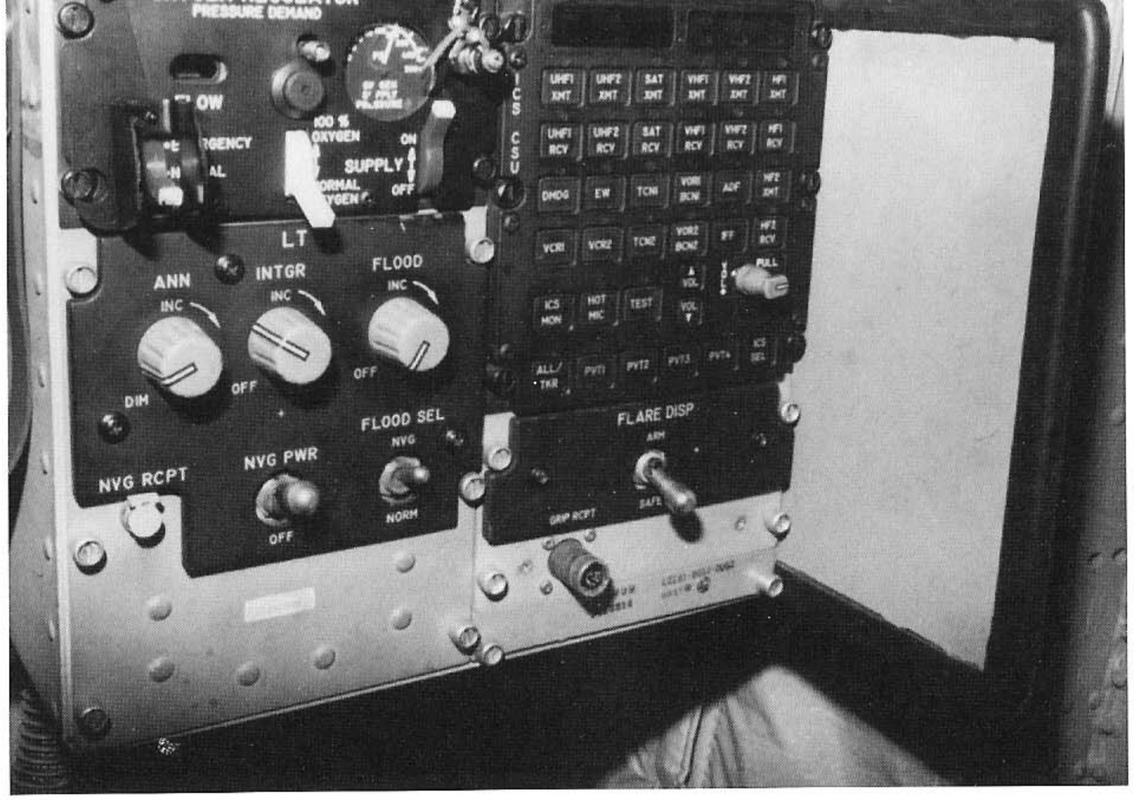
An AN/ASQ-24A stabilized tracking set is located in the forward crew doorway and is pulled away for crew access. This set includes a GE AN/ASQ-145 Low Light Level Television (LLLTV), with a wide-angle lens at upper left and a narrow-angle lens at the center. A Konrad AN/AVQ-18 laser designator/rangefinder is mounted in the upper right and an AN/AVQ-19 laser tracker and designator is located on the bottom of the AN/ASQ-24A.



The AC-130H's starboard observer station is located in the forward fuselage, ahead of the electronic compartment. The observer sits beside an oval window and watches for enemy Anti-Aircraft Artillery (AAA) and Surface-to-Air Missiles (SAMs) to warn his crew mates. (John Gourley)

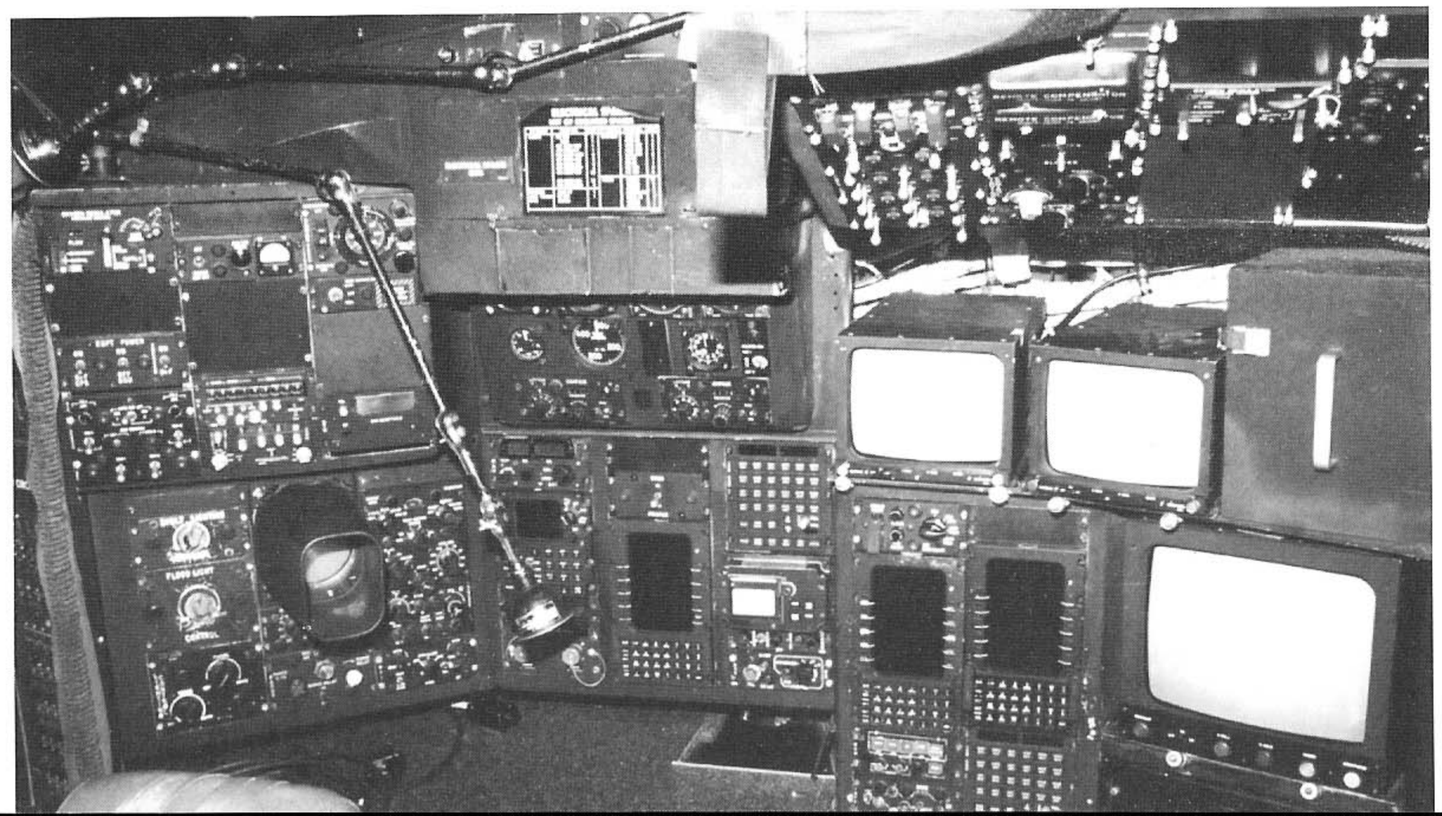
The starboard observer's bubble window is centered in an emergency escape hatch. This hatch would be jettisoned from the inside for rapid aircraft evacuation. The air deflector forward of the window keeps this view port clear in all weather conditions. (John Gourley)



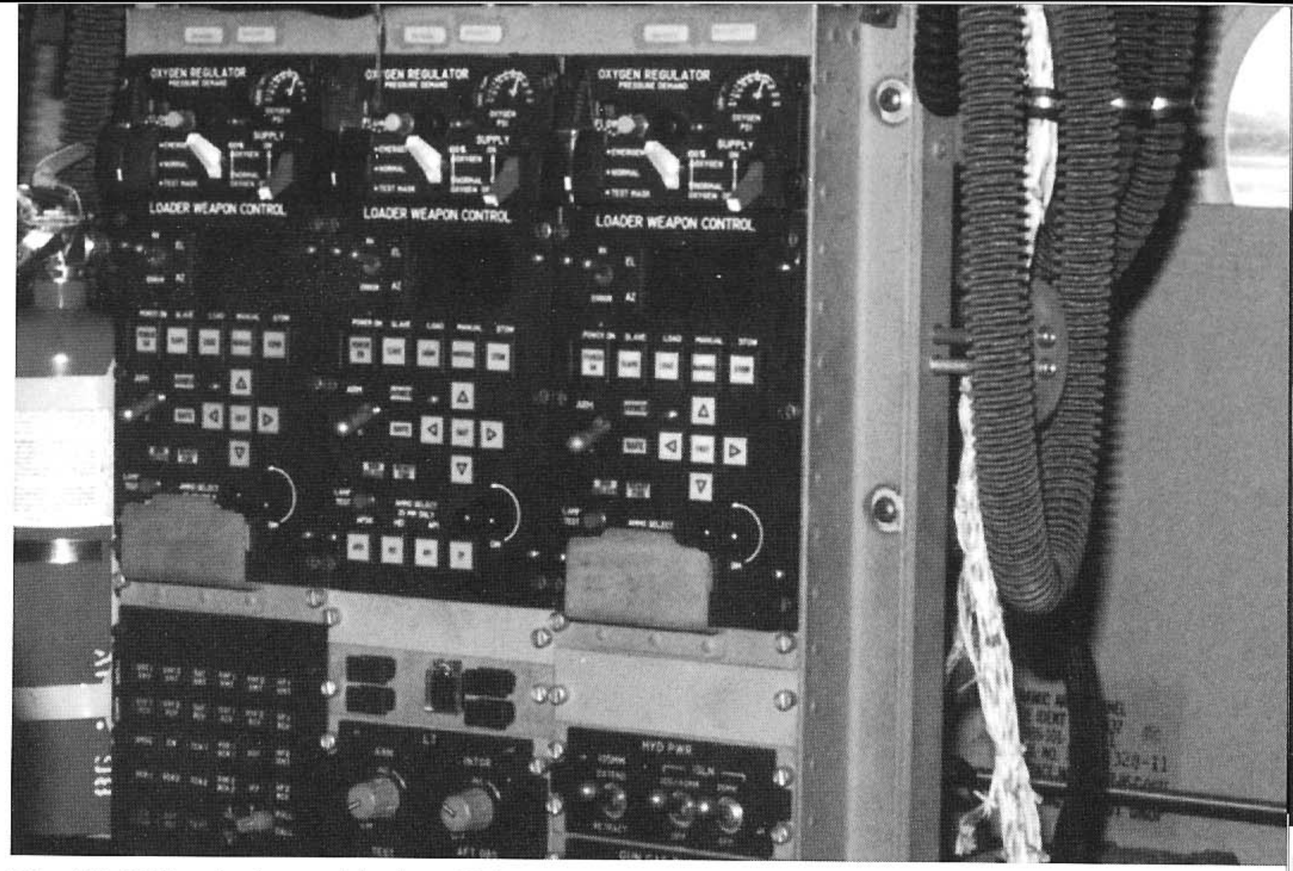


A small control panel faces the starboard forward observer station. An oxygen regulator is mounted on the upper port section, with interior lighting controls and Night Vision Goggle (NVG) switches below the regulator. The starboard side includes communications system buttons and a flare dispenser switch. (John Gourley)

Two systems operators sit at this console in the AC-130H's mid-fuselage along the starboard side. A hooded radar display is mounted on the port side, while three TV monitors to starboard display input from the AN/ASQ-24 tracking system. A pole-mounted work light is extended from the port compartment wall. (John Gourley)

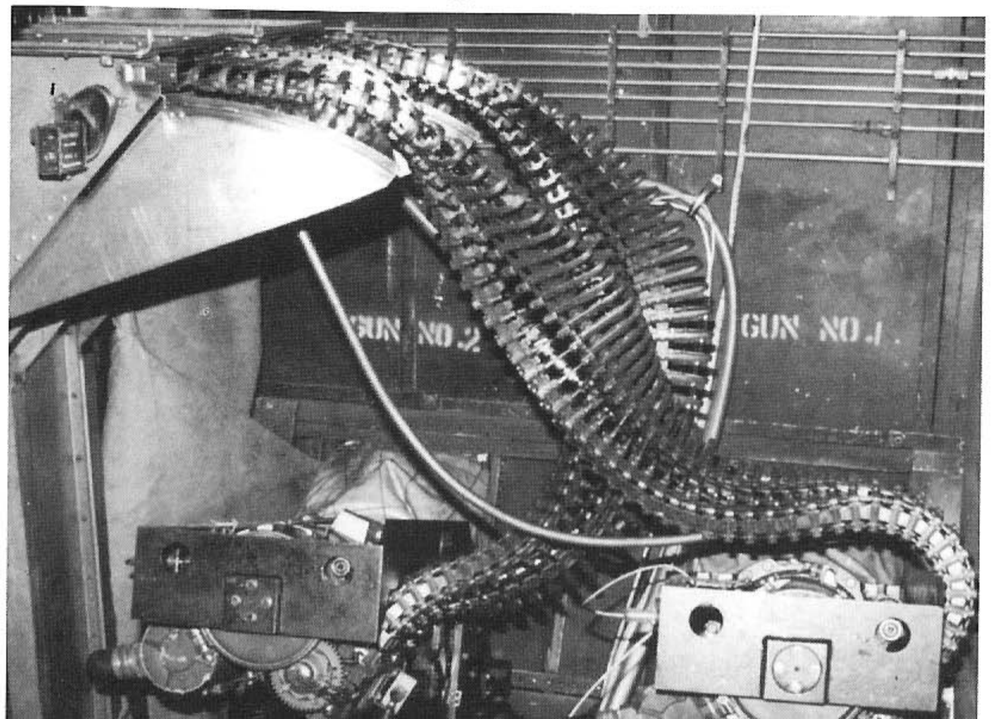


The Battle Management Booth is located along the starboard fuselage opposite of the area between the 20MM and 40MM cannon. The fire control officer responsible for overall weapons management sits in this booth. A fire extinguisher and a first aid kit are mounted on the booth's wall. (John Gourley)

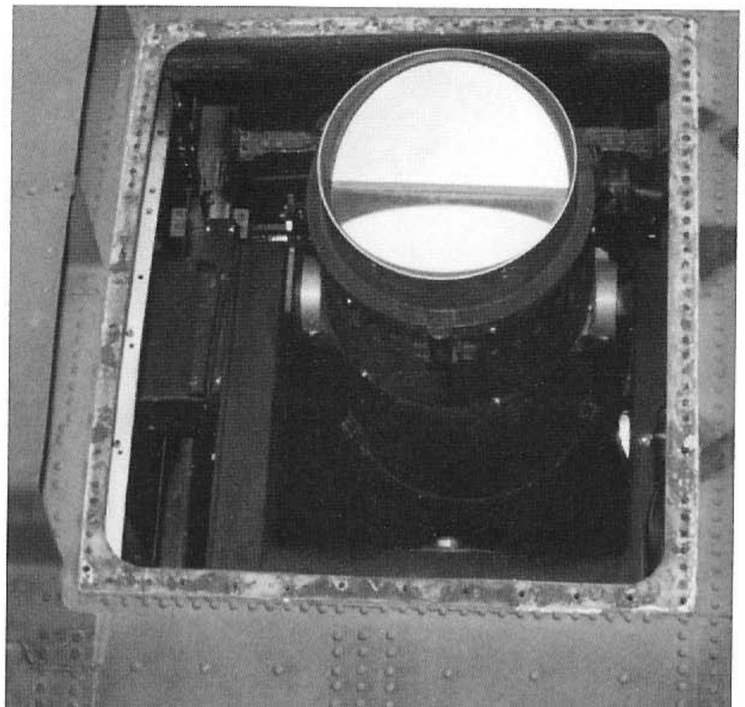


The AC-130H avionics rack in the mid-fuselage testifies to the complexity of the Spectre's mission. Three sets of oxygen regulators top the panel, with three sets of weapons controls below the regulators. The lower rack includes (from left) communications selection buttons, lighting controls, and weapons hydraulic power switches. (John Gourley)

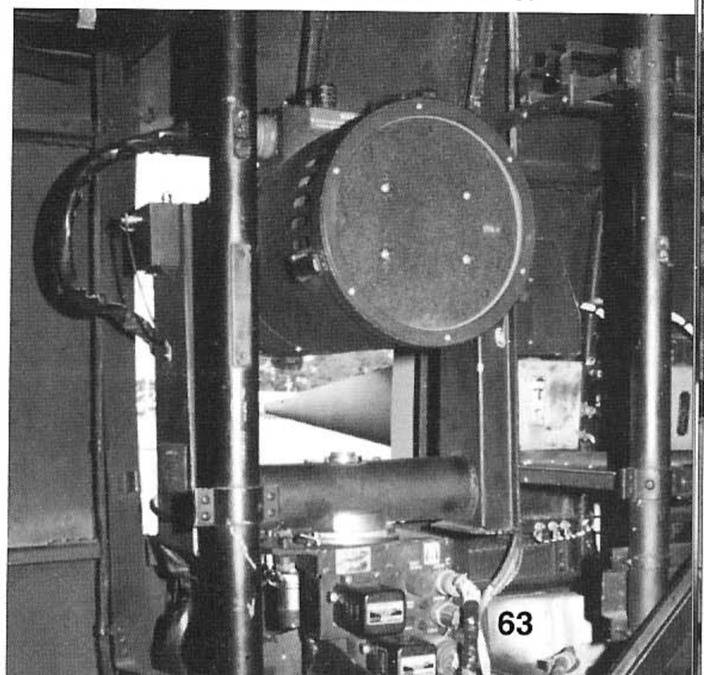
A pair of 20MM M61A1 Vulcan cannon are mounted in the port forward fuselage of the AC-130A/E/H variants. Feed chutes supply ammunition from magazines located along the fuselage wall. Both magazines hold up to 3000 rounds of ammunition. The M61A1 has been used on a variety of US fighters since the mid-1950s. (John Gourley)



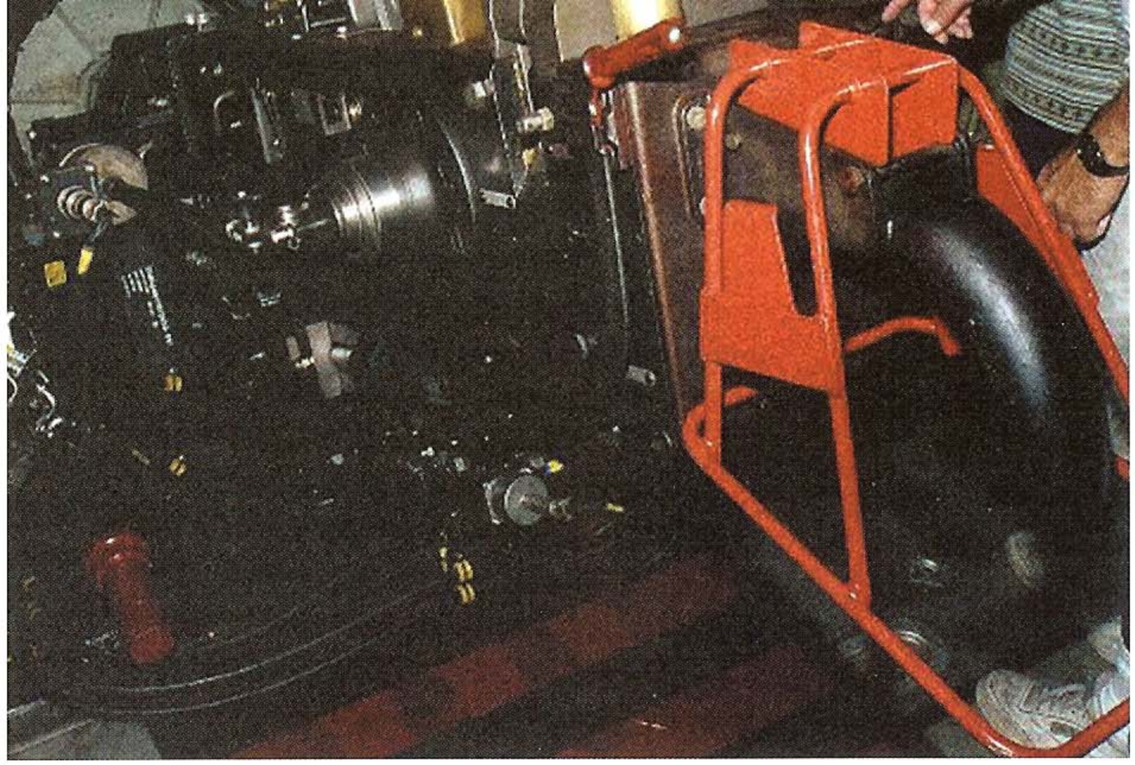
An AN/AVQ-17 2 kW searchlight is mounted in the aft fuselage above the cargo ramp. This xenon light uses both visible and Infrared (IR) light to illuminate the Spectre's targets. An air deflector is mounted immediately forward of the searchlight port. (John Gourley)



The AN/AVQ-17 system is placed on a trainable mount inside the AC-130H's aft fuselage. This searchlight is the illuminator for the PAVE PRONTO system, which modified AC-130s for night attack missions. PAVE PRONTO also included LLLTV and FLIR systems. (John Gourley)



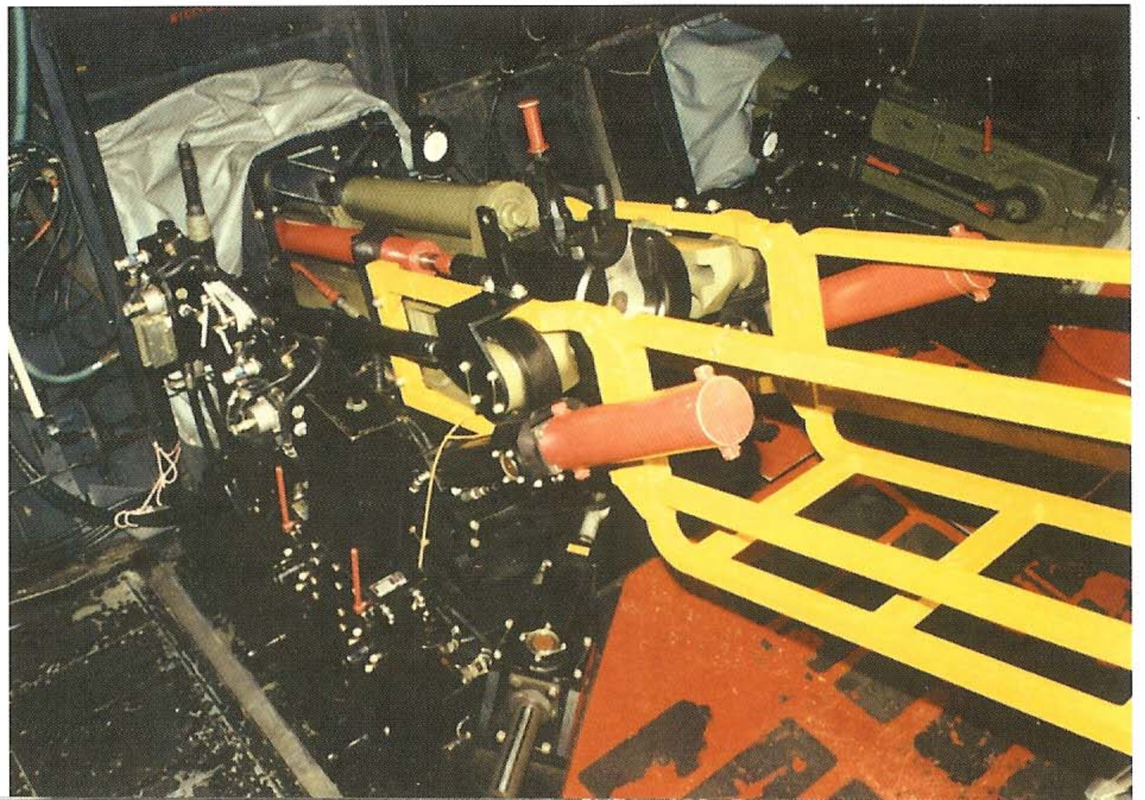
A modified steel barrel supports the breech of a 40MM M2A1 Modified (L60) cannon aboard an AC-130H. Four-round ammunition clips are manually fed into the upper breech mechanism. This weapon's firing rate is 120 rounds per minute (RPM) and the AC-130H is supplied with 416 rounds of High Explosive Incendiary (HEI) and Armor Piercing (AP) ammunition. (John Gourley)

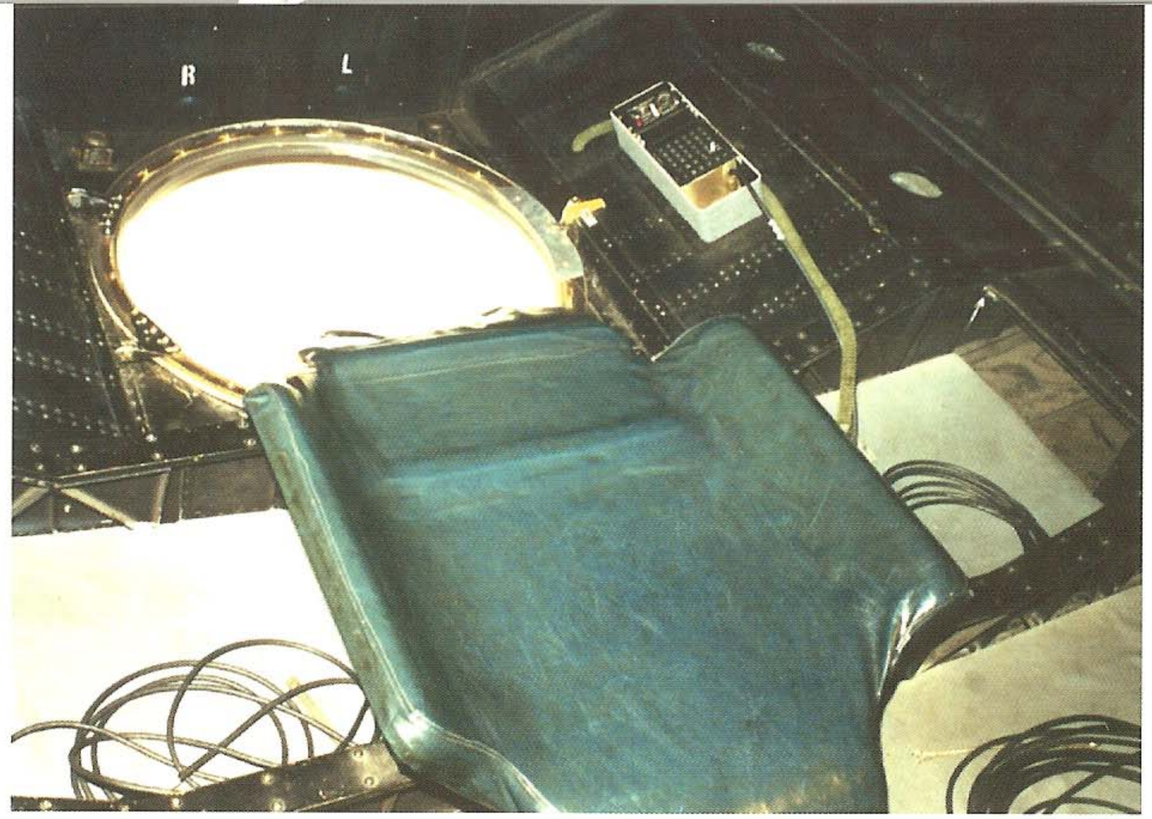


The 40MM Bofors gun is on a fully trainable hydraulic mount in the Spectre's port fuselage side. This is a shorter barreled version of the Swedish-designed, Canadian-built anti-aircraft gun extensively used in World War Two. The M2A1 has a muzzle velocity of 2890 feet (880.9 M) per second and a range of 11,000 yards (10,058.4 M). (John Gourley)

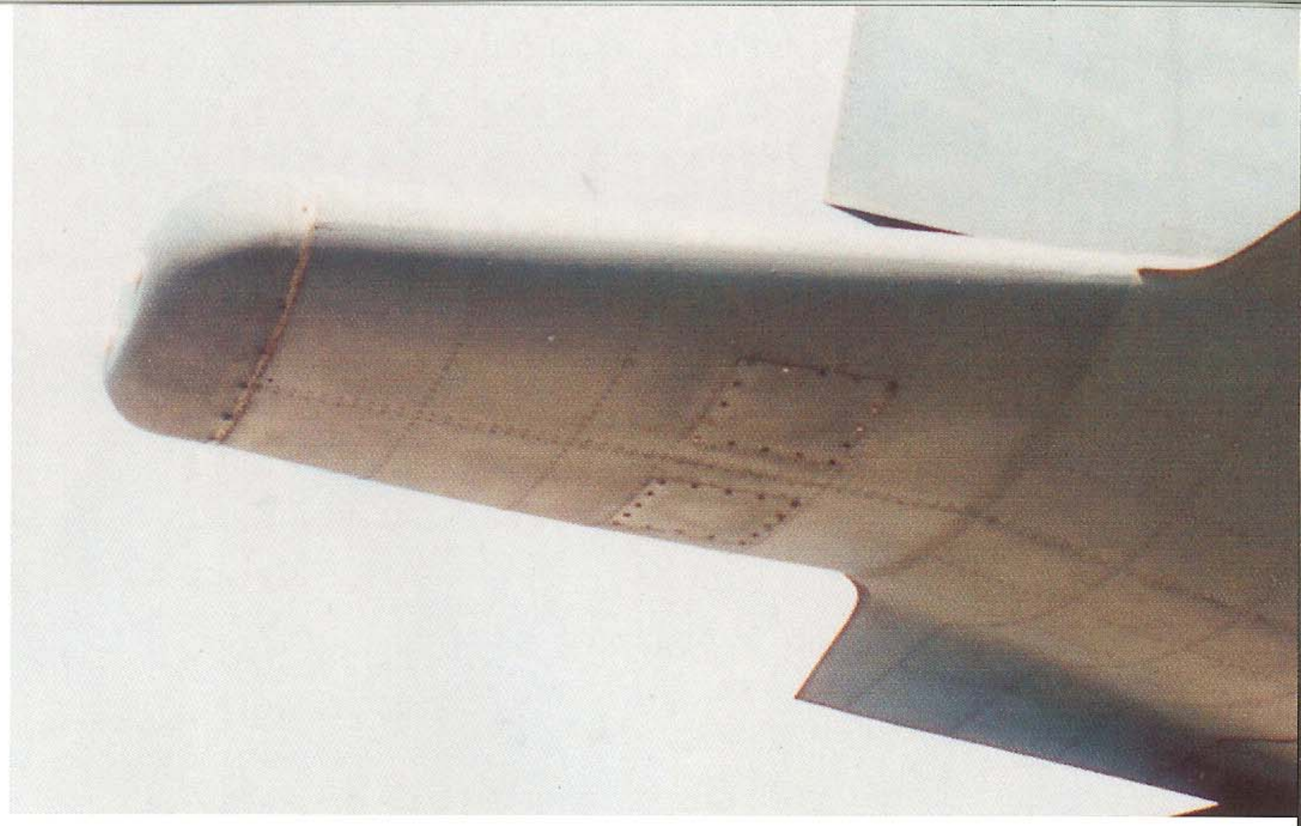
In 1972, the PAVE AEGIS program first installed a modified 105MM M102 howitzer into an AC-130E. This weapon replaced one of the two 40MM cannon previously carried. A flash suppressor on the muzzle kept the gun from giving the aircraft's position away at night. (John Gourley)

The M102 is fitted to a fully trainable hydraulic mount for ease of movement. This weapon has a muzzle velocity of 1620 feet (493.8 M) per second and a range of 13,123.4 yards (12,000 M). AC-130Hs carry 84 HE rounds and 16 White Phosphorous (WP) rounds for the howitzer, which fires up to eight RPM.





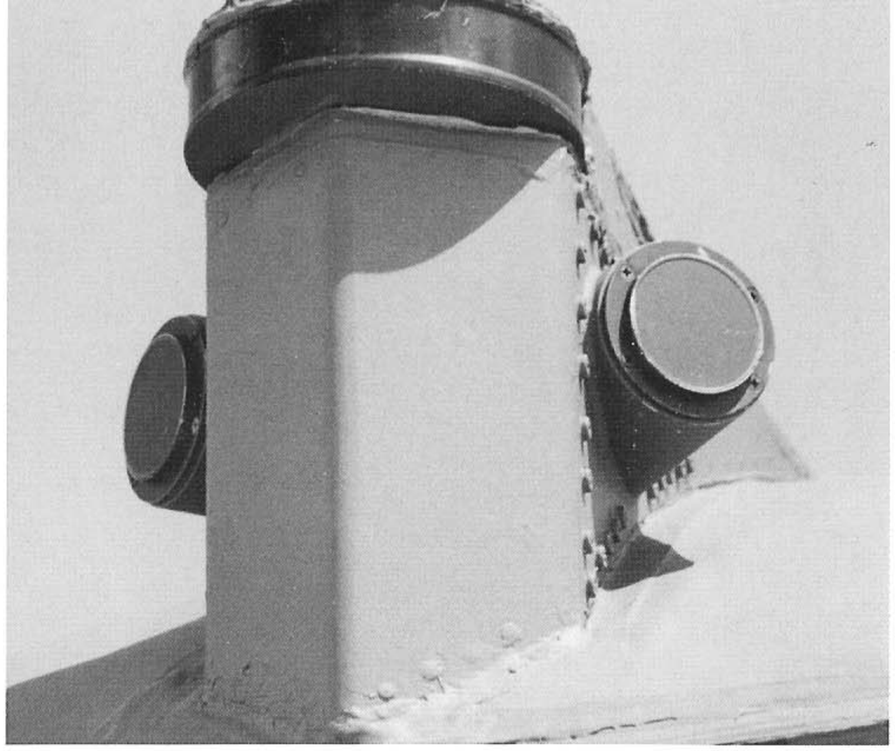
The AC-130H's aft observer lies prone on the aft cargo door near the round window. This crewman was strapped to the lowered door on earlier Spectres. The aft observer views the airspace and ground to make damage and threat assessments (John Gourley)



An Itek AN/APR-36 homing and warning ECM receiver is mounted inside a TRIM-7A tail section antenna. This antenna is on the extended tail fairing of an AC-130H. The AN/APR-36 alerts the Electronic Warfare Officer (EWO) to enemy ECM, allowing the EWO to take appropriate measures. (John Gourley)

The latest Hercules gunship variant is the AC-130U Spectre, which entered service in 1995. It can fly a number of missions, including Close Air Support (CAS), interdiction, armed reconnaissance, point defense, and escort of road and naval convoys, trains, and helicopters. The Spectre also performs surveillance, Combat Search and Rescue (CSAR), landing/drop zone support, and limited airborne command and control missions. Advanced avionics – including a Hughes AN/APQ-180 radar – give the AC-130U improved all-weather capability over previous Spectres. (USAF)

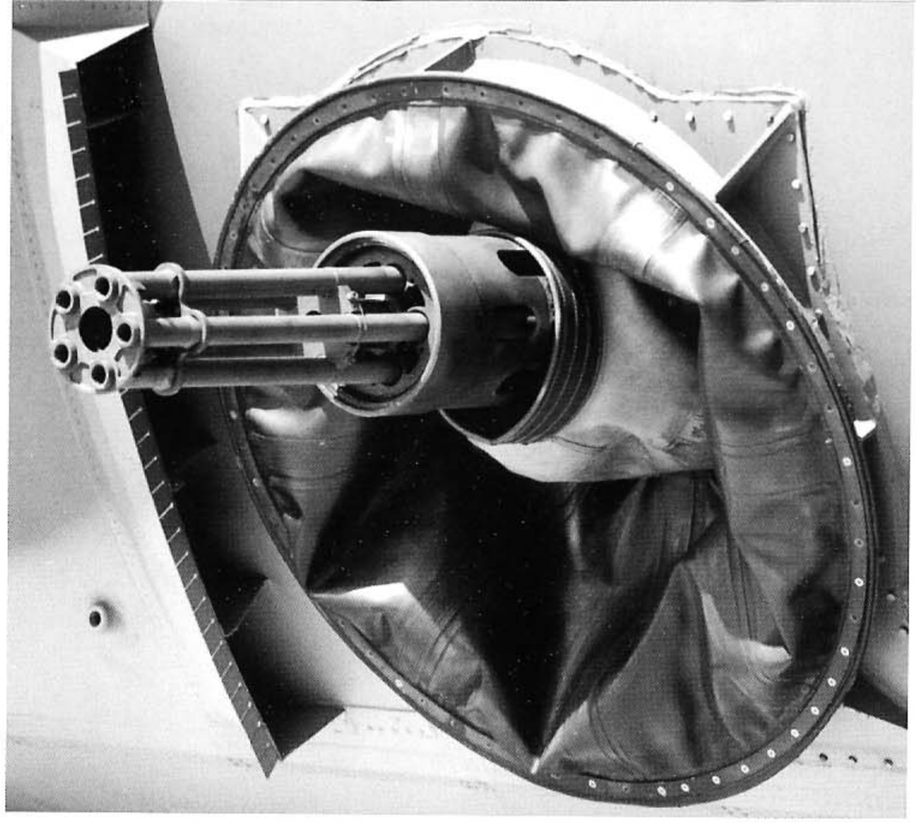
Rockwell (now Boeing North American) converted 13 C-130H-2s into AC-130Us, including this Spectre (90-0167), under a 1989 contract. The aircraft is assigned to the 4th SOS, 16th SOW at Hurlburt Field. Advanced sensors allow the AC-130U to engage two targets simultaneously. It has an unrefueled range of 2200 nautical miles (2533.3 miles/4076.9 KM), which is extended using in-flight refueling. (John Gourley)



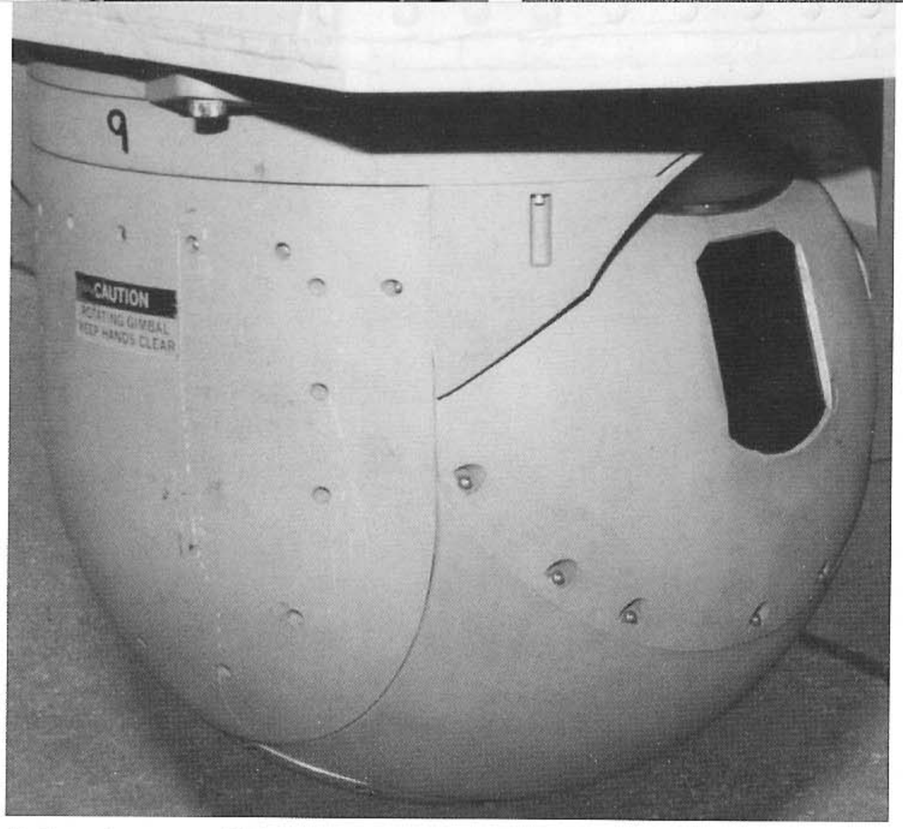
Itek AN/APR-36 Radar Warning Receivers (RWRs) are mounted atop the AC-130U's cockpit just forward of the aerial refueling receptacle. Receivers here and elsewhere on the airframe alert the crew to enemy radars tracking the Spectre. (John Gourley)

Anti-FOD (Foreign Object Damage) covers are placed over two starboard air inlets on this AC-130U (92-0253). These inlets bring in air to cool the vast electronic systems. Red REMOVE BEFORE FLIGHT streamers are attached to the inlet covers. The 13 AC-130U entered service at a per-unit cost of $72 million, compared to $46.4 million (in 1992 dollars) for each AC-130H. (Lou Drendel)

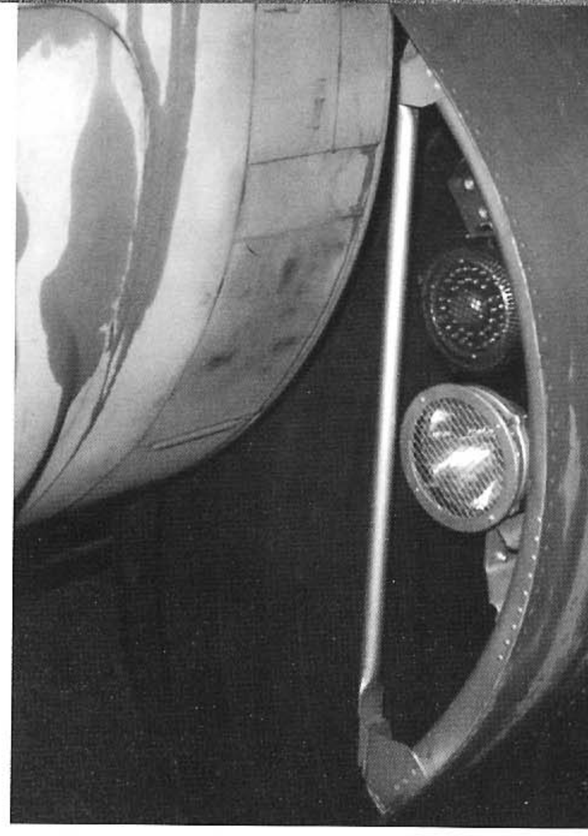
The AC-130U's starboard observer sits before a large rectangular window. This window offers a greater view of enemy threats than the smaller oval bubble used on the AC-130H. There is no air deflector to keep this window clear. A radar warning and ECM transmitter fairing is located immediately forward of the window's lower edge. (Lou Drendel)



A 25MM GE GAU-12 Equalizer cannon replaces the two forward 20MM M61A1 cannon on earlier Spectres. This five-barrel Gatling-type weapon is also used on the AV-8B Harrier attack aircraft. The GAU-12 fires up to 1800 RPM at a muzzle velocity of 3600 feet (1097.3 M) per second out to 12,000 feet (3657.6 M). It is supplied with 3000 rounds of HEI ammunition. (John Gourley)



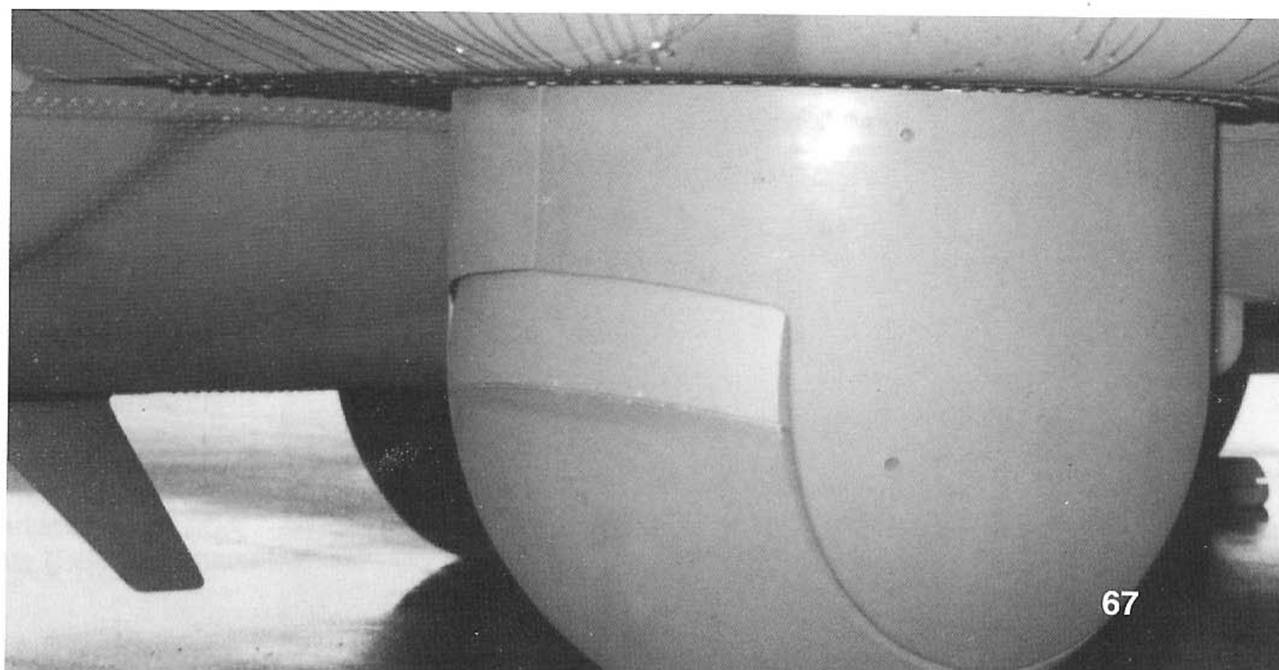
A turret-mounted Texas Instruments AN/AAQ-17 FLIR is mounted under the AC-130U's port forward fuselage. The FLIR operator inside the fuselage trains the turret and raises or lowers the FLIR to obtain IR images of the terrain. These images allow the Spectre's crew to discover camouflaged targets by their heat signatures. (John Gourley)



A Night Vision Goggle (NVG)-compatible light is mounted above the standard landing light inside the AC-130U's main landing gear doors. Pilots wearing NVGs can see the terrain below on approach and landing when that light is turned on at night. (John Gourley)

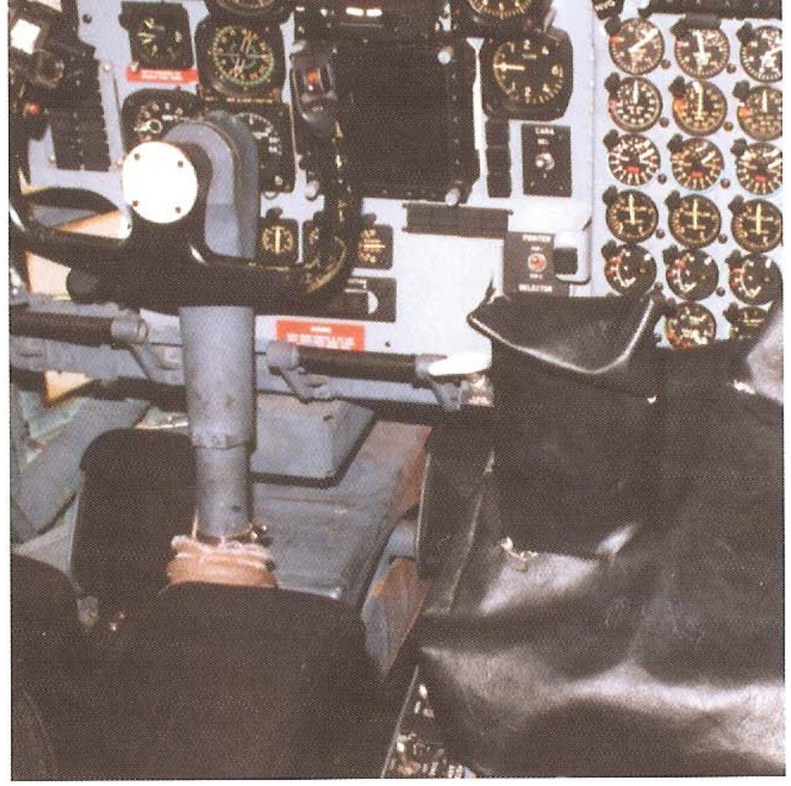
A Watkins-Johnson WJ-1840 (AN/APR-46) panoramic microwave receiver antenna (left) is mounted on the AC-130U's centerline. The blade antenna is for the Northrop AN/ALT-32 noise jamming system, while the conical device is the Cincinnati Electronics AN/AAR-44 Missile Approach Warning System (MAWS) antenna. A MAWS antenna spins a full 360° to detect heat plumes from SAMs. (John Gourley)

The Ball Aerospace All-Active Low-Light Level Television (AALLLTV) is mounted in a turret located on the port landing gear sponson. This turret is slewed a full 360° to provide a TV image of the terrain in all light levels. AALLLTV aids the weapons crew to accurately sight targets and aim weapons. A laser target rangefinder and designator is included in this turret. (John Gourley)



The AC-130U instrument panel retains the C-130H's conventional flight instruments, but adds three Multi-Function Displays (MFDs) for supplemental information. These displays are located on the upper center and in front of both the pilot and co-pilot. Several additional buttons and switches are placed on both control yokes. The Dark Gull Gray and Instrument Black AC-130U flight deck is NVG compatible. AC-130U crews have nicknamed their aircraft the 'U-Boat,' while the USAF's official nickname is Spooky II. The latter is in deference to the original gunship, the AC-47 Spooky from the Vietnam War. (John Gourley)

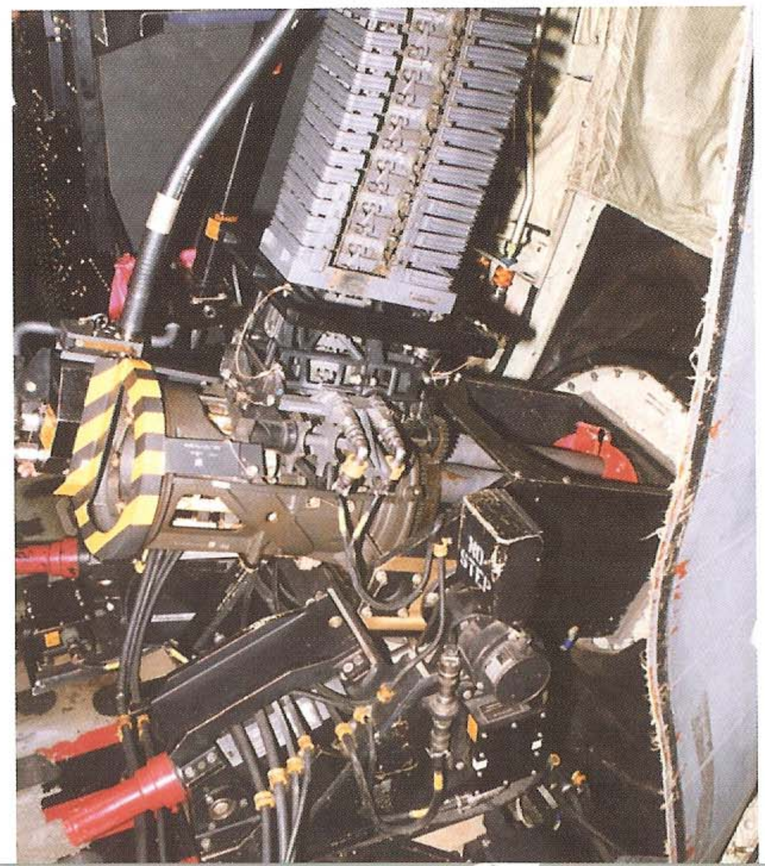
The AC-130U pilot's gun sight is mounted in the portside window, as on earlier Spectres. Sighting information is projected onto a GEC-Marconi Heads-Up Display (HUD). AC-130 pilots put the Spectre into a 30° port bank to line up on the target. The weapons fire while the aircraft makes a pylon turn around the target. (John Gourley)

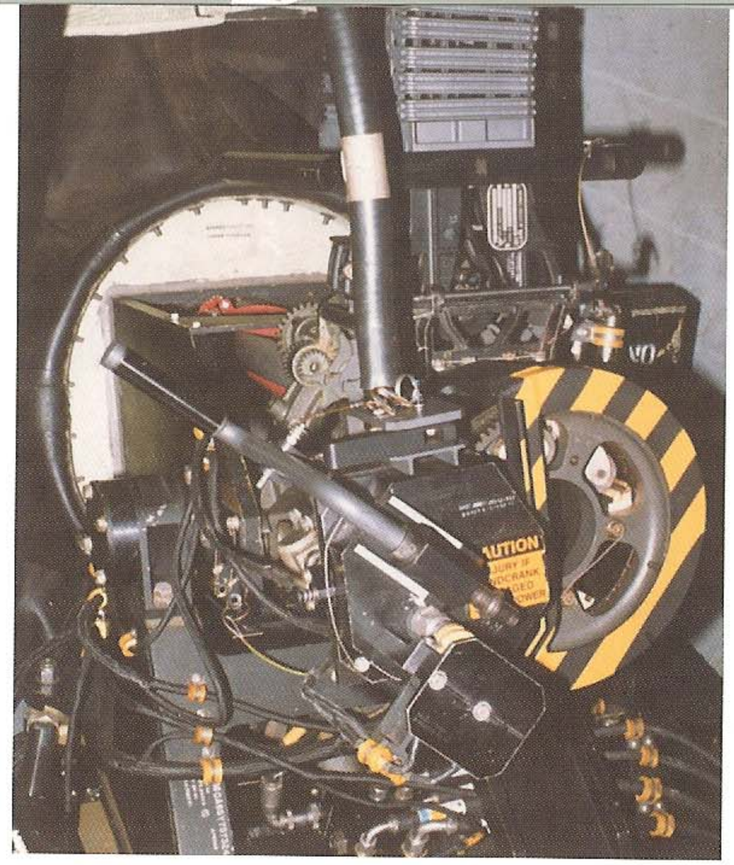


The AC-130U panel incorporates most of the modern avionics upgrades, including both Inertial Navigation System (INS) and Global Positioning System (GPS) for aircraft and target position plotting. An electronic Horizontal Situation Indicator (HSI) displays INS and GPS data on the instrument panel. A moving map display is also installed. (John Gourley)

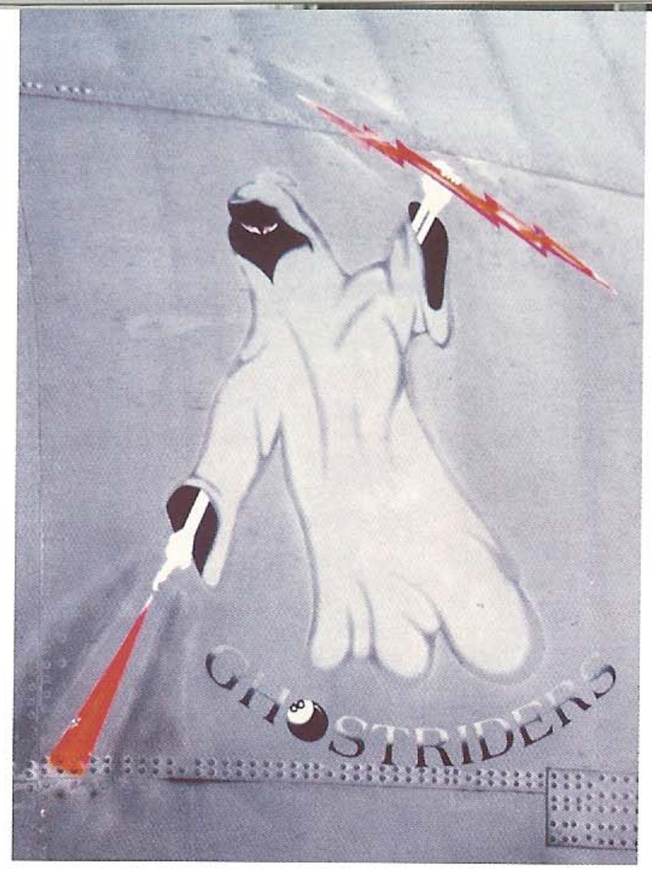
(Left) The EWO occupies this station in the AC-130U's starboard mid-fuselage. Two TV screens allow him to view images from the AALLLTV and FLIR sensors and to detect and counter enemy radars and sensors. The aircraft's highly complex suite of countermeasures include the AN/ALQ-172 ECM system, the AN/ALR-56M radar warning receiver, the AN/APR-46A panoramic receiver, and the AN/AAR-44 IR warning receiver. The latter is integrated with AN/ALE-40 chaff and flare launchers. (John Gourley)

(Right) The 25MM GAU-12 canon is supplied with 3000 rounds of HEI ammunition. Rounds are fed from its magazine through a feed chute to the weapon's breech. The operator can select from a series of burst lengths to accommodate the target's nature. The fully trainable GAU-12 allows the AC-130U to simultaneously attack multiple targets up to 0.6 mile (1 KM) apart. (John Gourley)

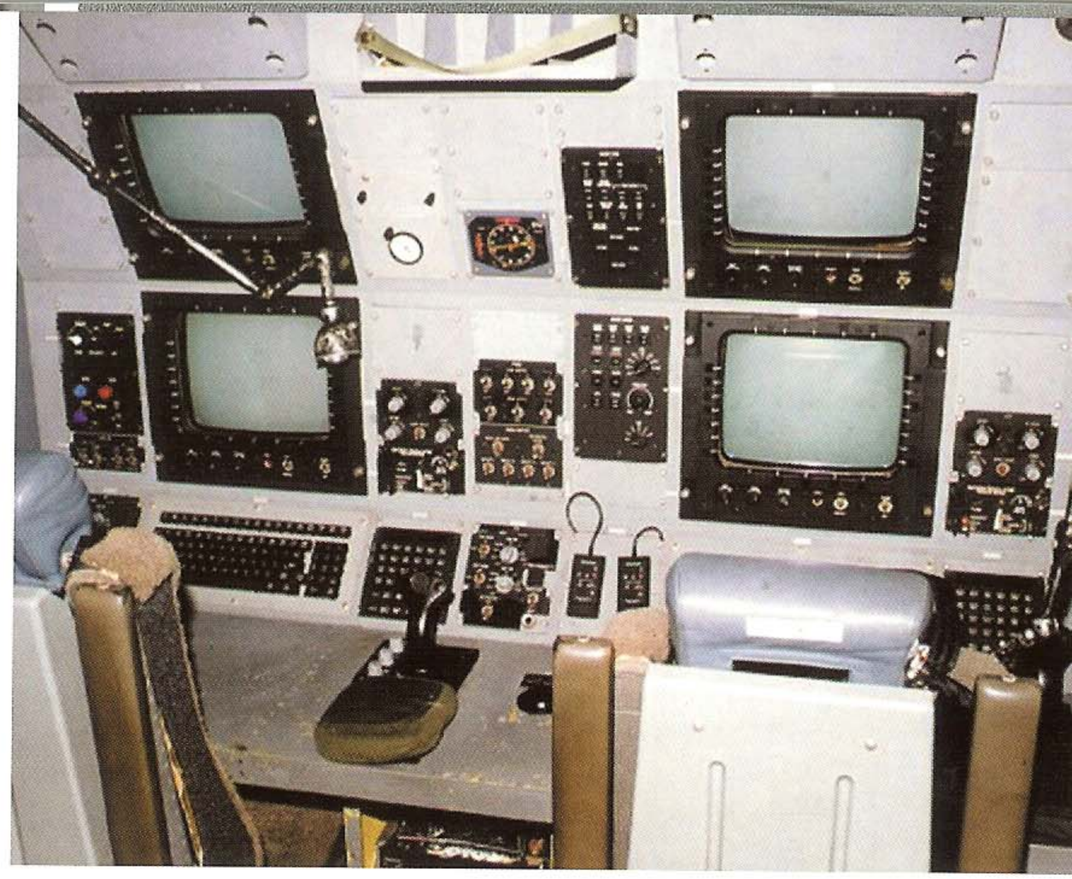




The GAU-12 is hydraulically trained for aiming and firing through a wide arc on the port forward fuselage. A flexible seal keeps the gun bay dry while allowing the cannon to maneuver into firing position. GE developed the GAU-12 from the 30MM GAU-8 Avenger that arms the A-10 Thunderbolt II. (John Gourley)



AC-130 crews are allowed to paint tasteful nose art on their aircraft. One example is GHOSTRIDERS, which adorned an AC-130U displayed at Little Rock AFB, Arkansas in October of 1998. The name and insignia are appropriate for a gray painted aircraft that usually flies and strikes at night. (Lou Drendel)



Operators of the FLIR (port) and AALLLTV (starboard) work at this console inside the Spooky II's mid starboard fuselage. They have systems and communications controls on the console along with four TV screens to view images from their sensors. Both operators use counter-mounted joysticks to maneuver their sensors in the desired direction. (John Gourley)

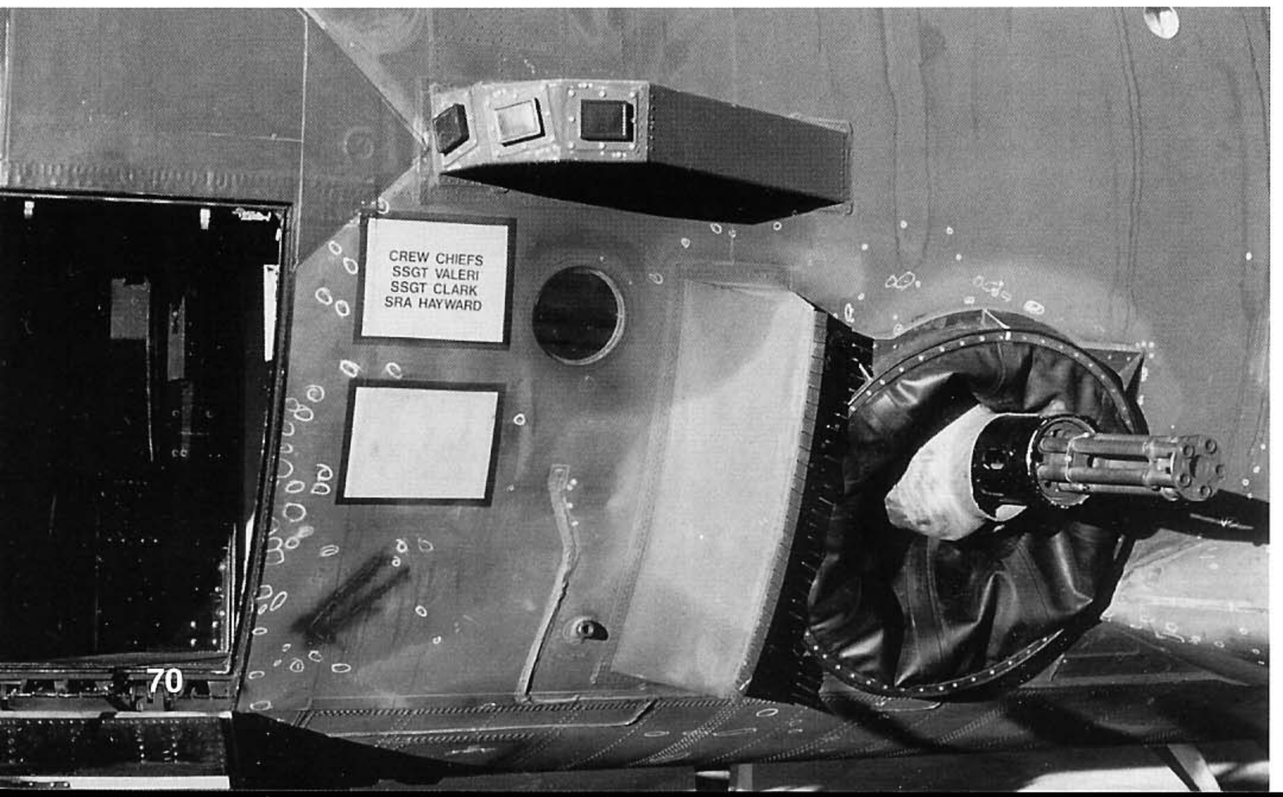
(Left) The AC-130U's battle management booth includes displays for the nose-mounted AN/APG-180 synthetic aperture fire control radar system. This radar is derived from the AN/APG-70 fitted to the F-15E Eagle dual-role fighter. The AN/APG-180 produces high-resolution images of targets, ordnance impact points, weather, and ground beacons. Basic flight instruments are mounted above the radar displays and a flexible work light extends from a pole mounted on the upper console. (John Gourley)

(Right) A four-round clip of practice 40MM ammunition is placed beside an M2A1 Modified (L60) Bofors breech mechanism. This weapon is capable of firing 100 rounds per minute and is on a fully trainable mount. Its primary round is the PGU-9B/B High Explosive Incendiary (HEI). (John Gourley)

The AC-130U prototype (87-0128) taxis at Edwards AFB, California on 18 October 1992. This first 'U-Boat' was assigned to the 6512th Test Squadron (TS) at Edwards for testing. The AC-130U is one of the world's most complex weapons systems, with 609,000 lines of software code in its mission computers and avionics systems. (Ted Carlson/Fotodynamics)

The most common nose art on AC-130s is a 'Spectre' blazing away with a Minigun. This version appeared on the AC-130U prototype. This aircraft was originally painted in the 'European I' camouflage scheme of Dark Green (FS34079), Gunship Green (FS34092), and Gunship Gray (FS36118). (Ted Carlson/Fotodynamics)

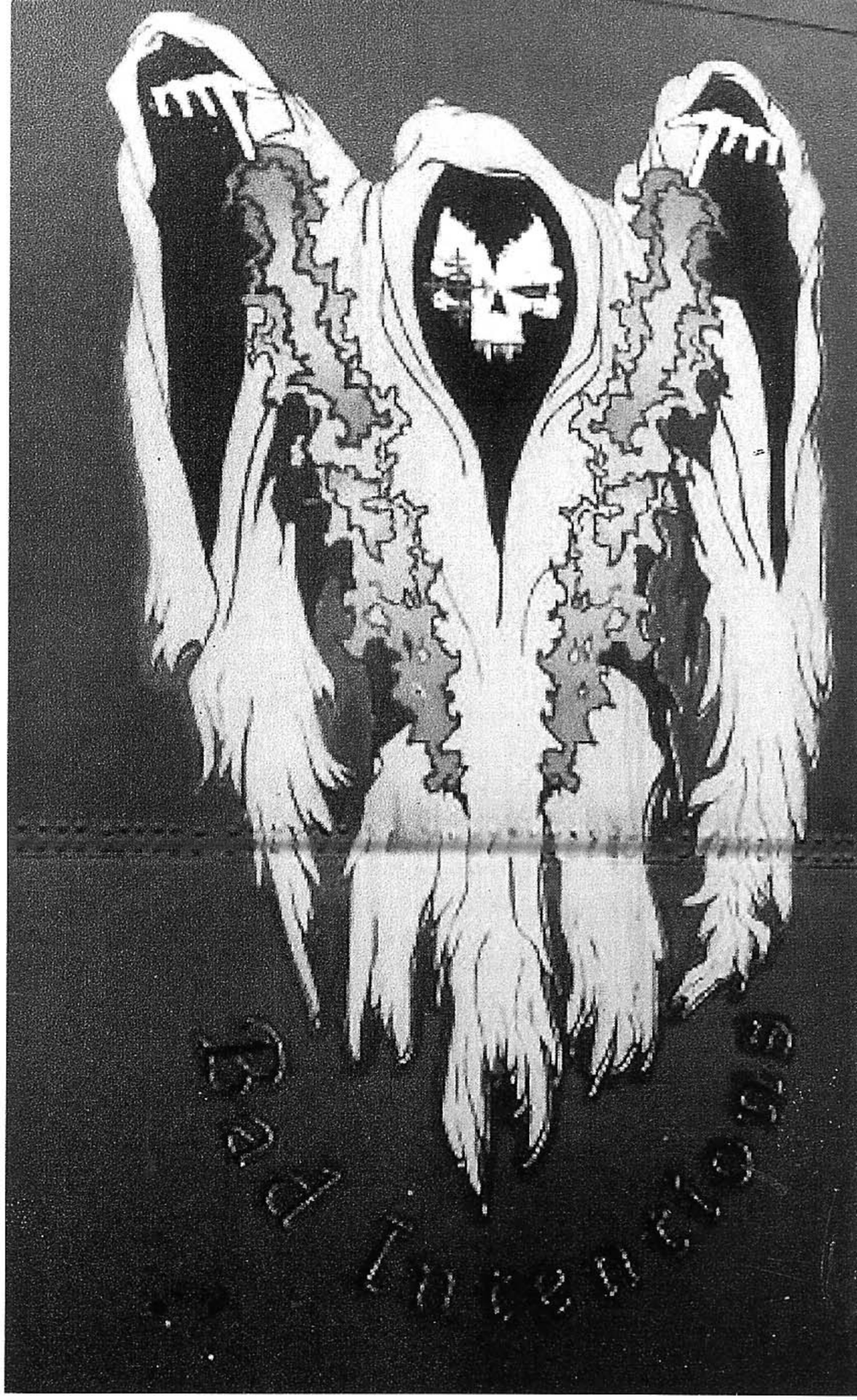
The AN/ASQ-24A sighting system has been moved out of the crew access doorway of this AC-130U (ED/87-0128). It is assigned to the 418th TS, 412th TW at Edwards AFB on 23 October 1993. A fairing for an ECM transmitter and radar warning receivers is mounted aft and above the hatchway. An air shield is mounted before the 25MM GAU-12 cannon. (Ted Carlson/Fotodynamics)



The loadmaster stands in the cockpit roof escape hatchway of a 412th TW AC-130U (89-0511) on 20 August 1993. His perch provides the pilots with additional 360° views of ground obstacles during taxiing. The Hercules has additional roof escape hatches in the mid fuselage and aft fuselage. This Spooky II is painted overall Gunship Gray. (Ted Carlson/Fotodynamics)

(Above) The AC-130U's Electronic Warfare Officer (EWO) station is located in a containerized battle management booth. This booth is installed on the starboard side of the fuselage. A black track ball is mounted in the table top for maneuvering computer screen cursors. This allowed the EWO to concentrate specific countermeasures against particular threat areas. (John Gourley)

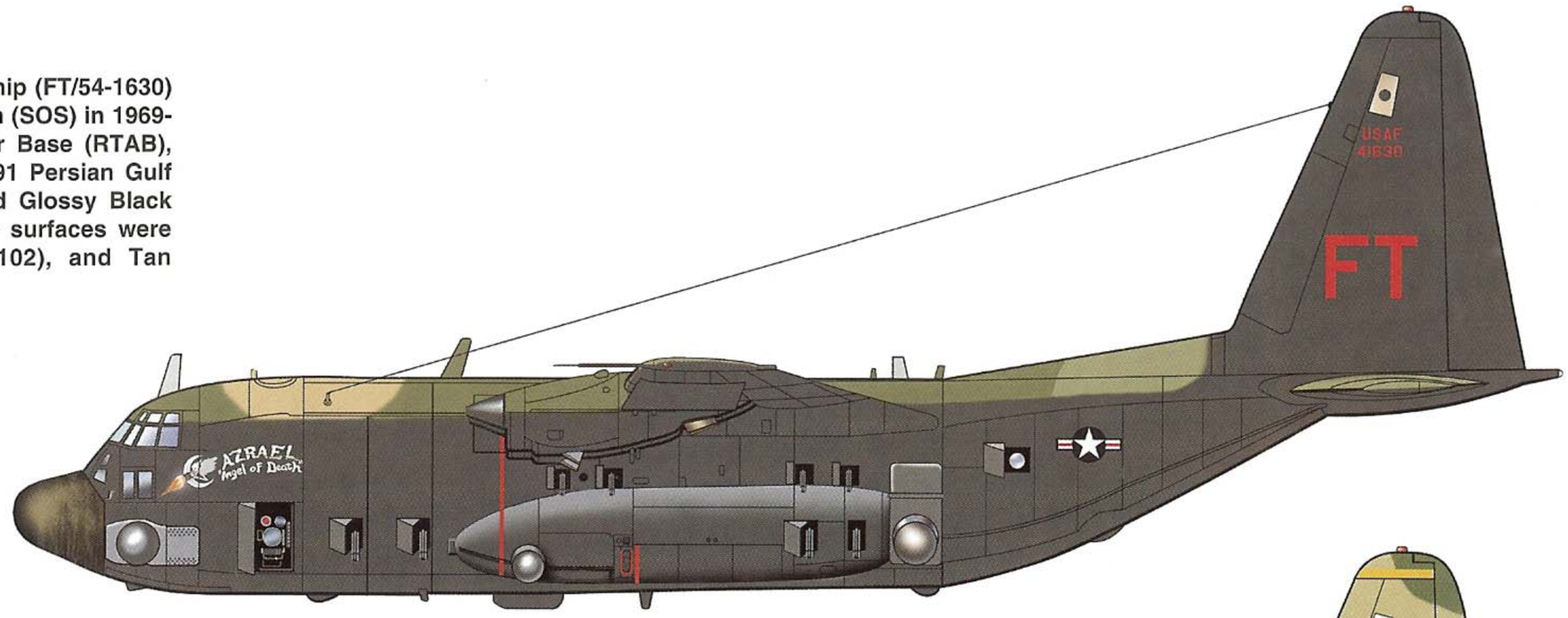
(Right) The weapons loader control panel is typical of the compact and clean format used on the AC-130U's control panels. The three columns comprising the upper two thirds of this panel includes oxygen regulators and loader's controls. Controls along the lower panel section are for (from left) radios, lighting, hydraulic power, and purging gun gas from the weapons. (John Gourley)



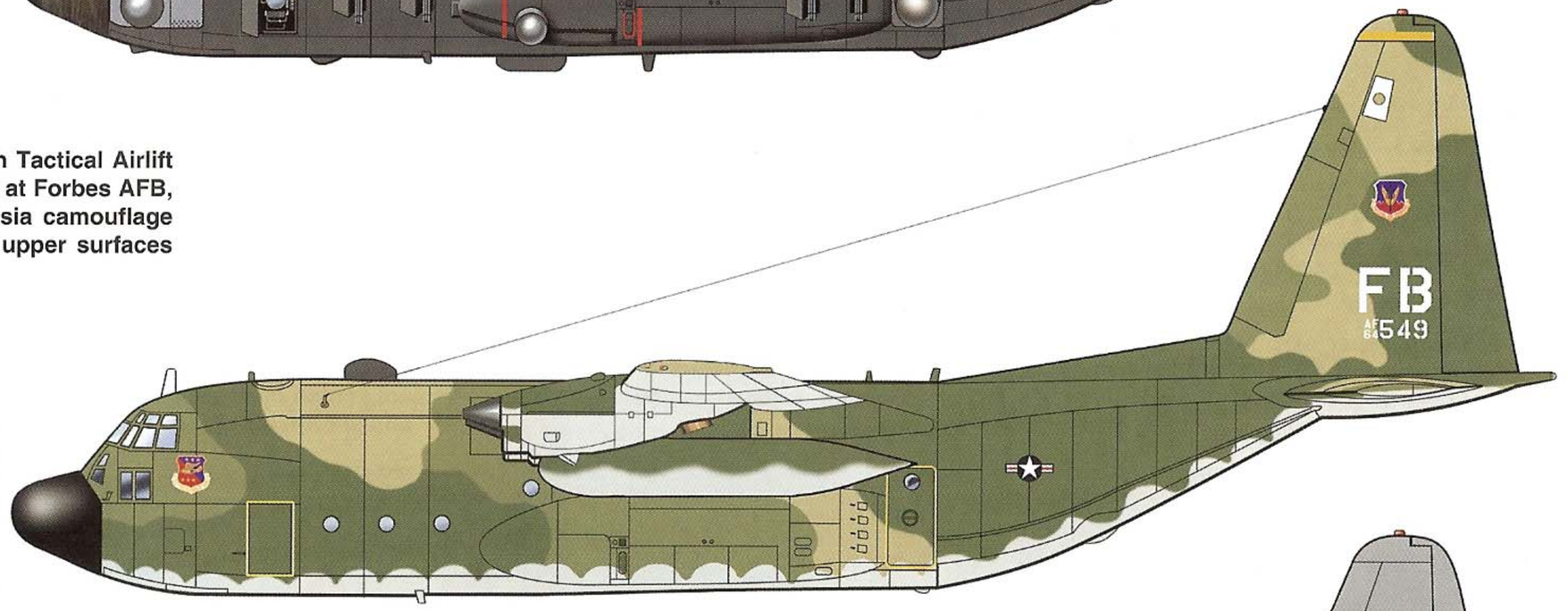
Many AC-130 nose art designs feature some version of the Grim Reaper. This version graces Bad Intentions, an AC-130U (90-0164). Nose art enhances crew morale and provides a touch of bright color on an otherwise dark and drab airframe. (John Gourley)

The author earned Senior Parachutist Wings while serving with the 82nd Airborne Division from 1956 until 1958. He made several jumps from the C-130, including this one from a C-130A (56-483) of the 463rd Troop Carrier Wing from Ardmore AFB, Oklahoma. (This Wing is now the 463rd Airlift Wing at Dyess AFB, Texas.) The Hercules is natural metal, with Insignia Red (FS11136) panels on the outer wings and tail. The 450 gallon (1703.4 L) fuel tanks are mounted between the engine nacelles.

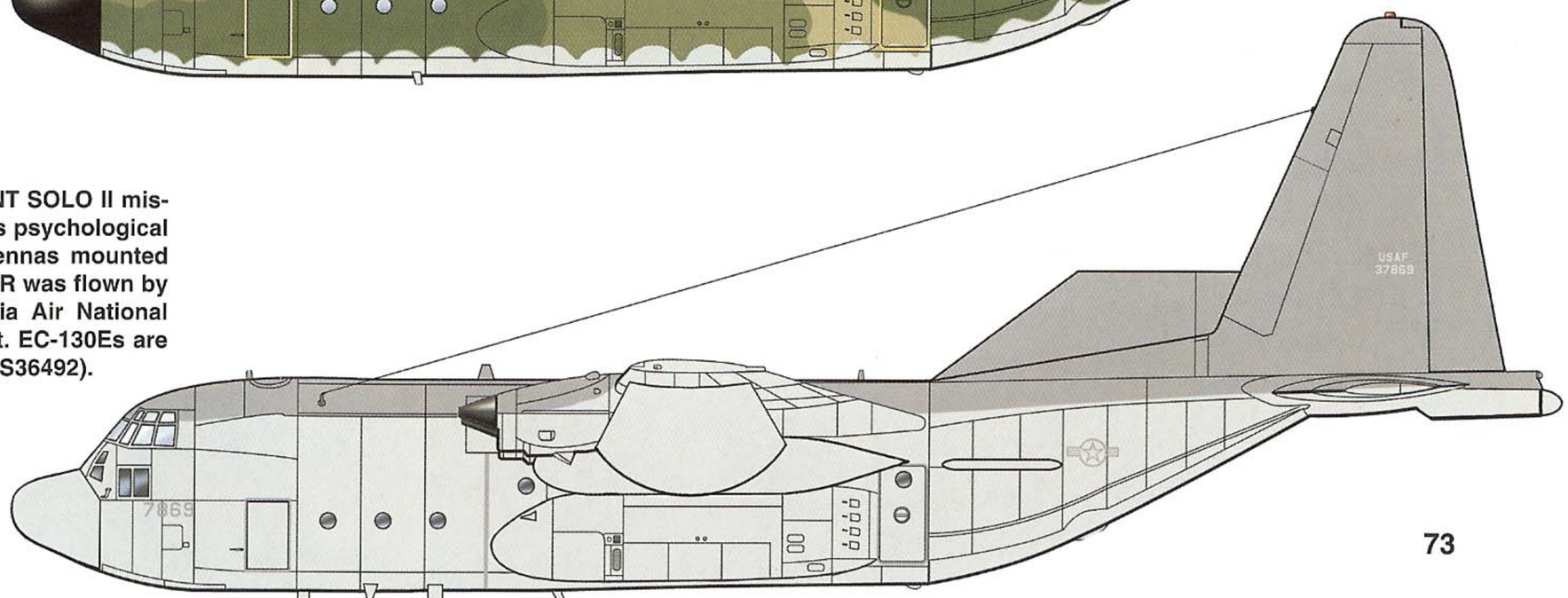
AZRAEL "Angel of Death" was an AC-130A gunship (FT/54-1630) assigned to the 16th Special Operations Squadron (SOS) in 1969-70. This unit was based at Ubon Royal Thai Air Base (RTAB), Thailand. The aircraft later saw action in the 1991 Persian Gulf War. During the Vietnam War, this AC-130A had Glossy Black (FS17038) sides and undersurfaces, while upper surfaces were Dark Green (FS34079), Medium Green (FS34102), and Tan (FS30219).



This C-130E (FB/64-549) was assigned to the 48th Tactical Airlift Squadron (TAS), 313th Tactical Airlift Wing (TAW) at Forbes AFB, Kansas in 1972. It is painted in the Southeast Asia camouflage scheme of Dark Green, Medium Green, and Tan upper surfaces with Light Gray (FS36622) undersurfaces.



Among the EC-130E RIVET RIDERs for the VOLANT SOLO II mission was this aircraft (63-7869). The aircraft carries psychological warfare broadcast equipment and employed antennas mounted on the upper fin and lower wings. The RIVET RIDER was flown by the 193rd Special Operations Wing, Pennsylvania Air National Guard (ANG) from Harrisburg International Airport. EC-130Es are painted in Dark Ghost Gray (FS36320) and Gray (FS36492).

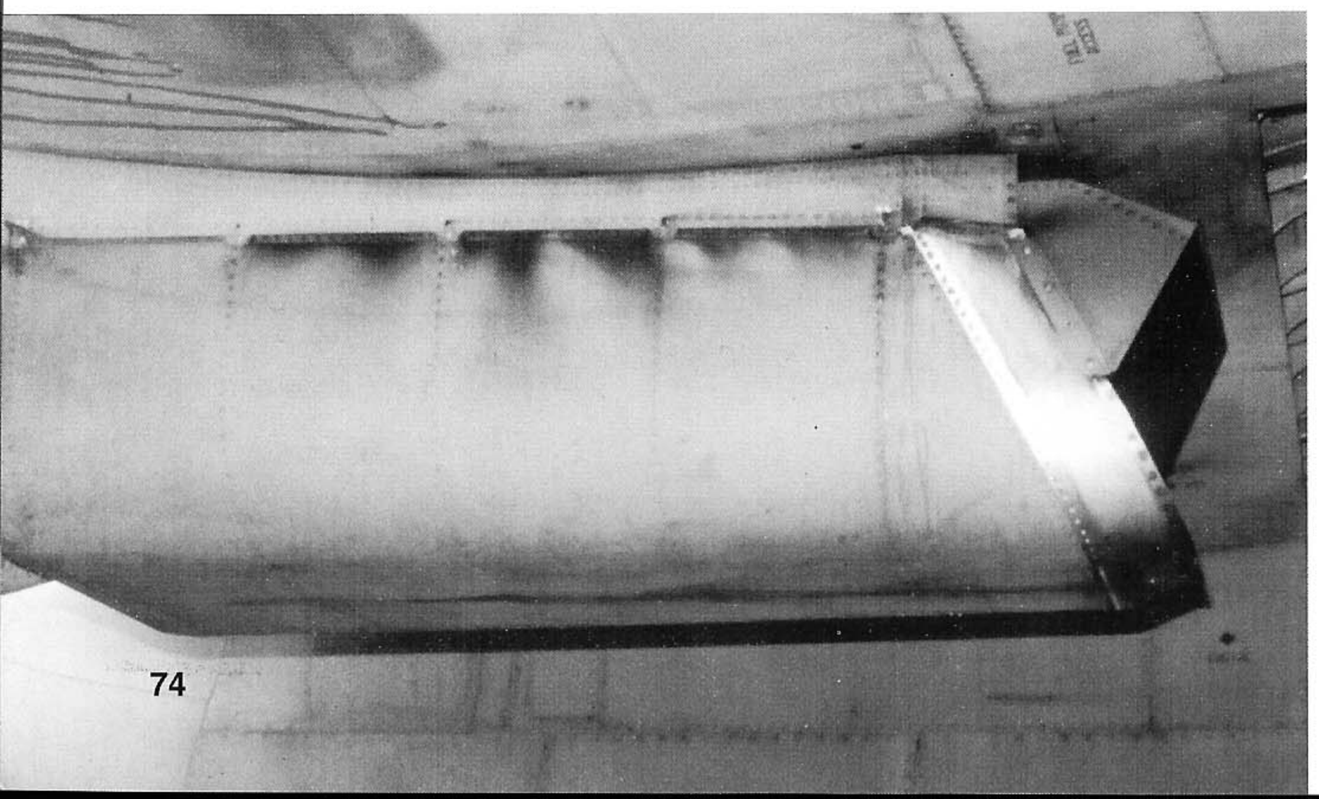


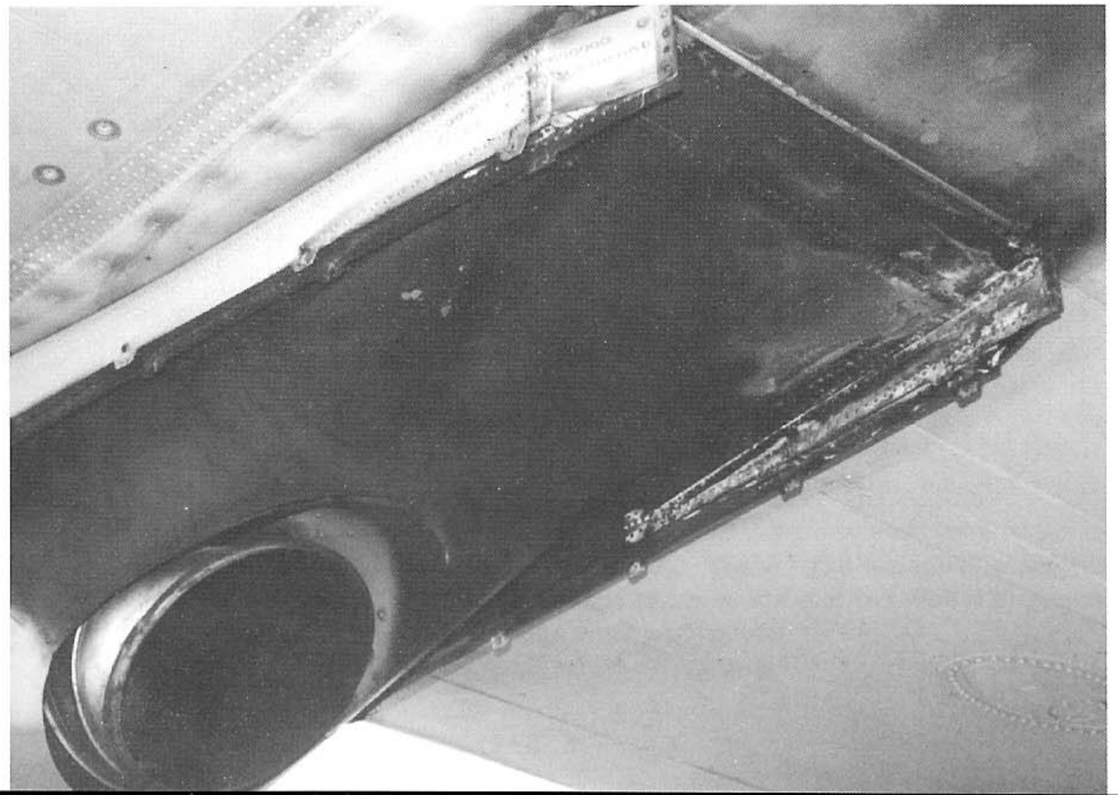
The AC-130U and earlier Spectres are equipped with air data probes on the outboard wing areas and on the starboard nose side. This probe collects atmospheric data – air temperature, pressure, and speed – for feeding to the aircraft's sensors. This information allows accurate navigation and targeting.

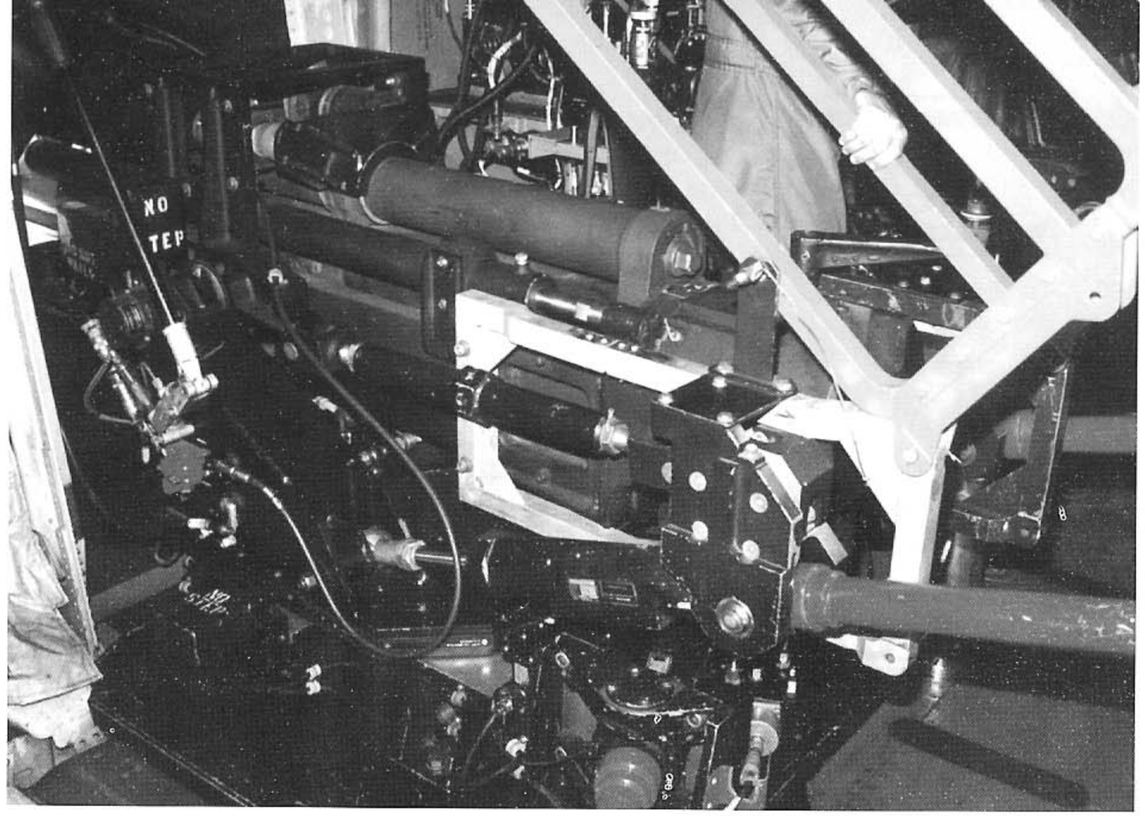
The exhaust shroud is one of the AC-130U's primary defensive improvements on earlier AC-130 variants. This shroud fits over the engine exhaust and mixes the hot exhaust gases with cooling air scooped at the shroud's front. The resulting cooled exhaust flows out the shroud's aft end. (John Gourley)

The exhaust shroud reduced the heat generated by the engine exhaust. This measure lessens the AC-130U's vulnerability to heat-seeking missiles, including the Soviet 9M32 *Strela* 2 (SA-7 Grail) shoulder-fired SAM. Traces of hot exhaust residue seep from the shroud's seal with the nacelle. (John Gourley)

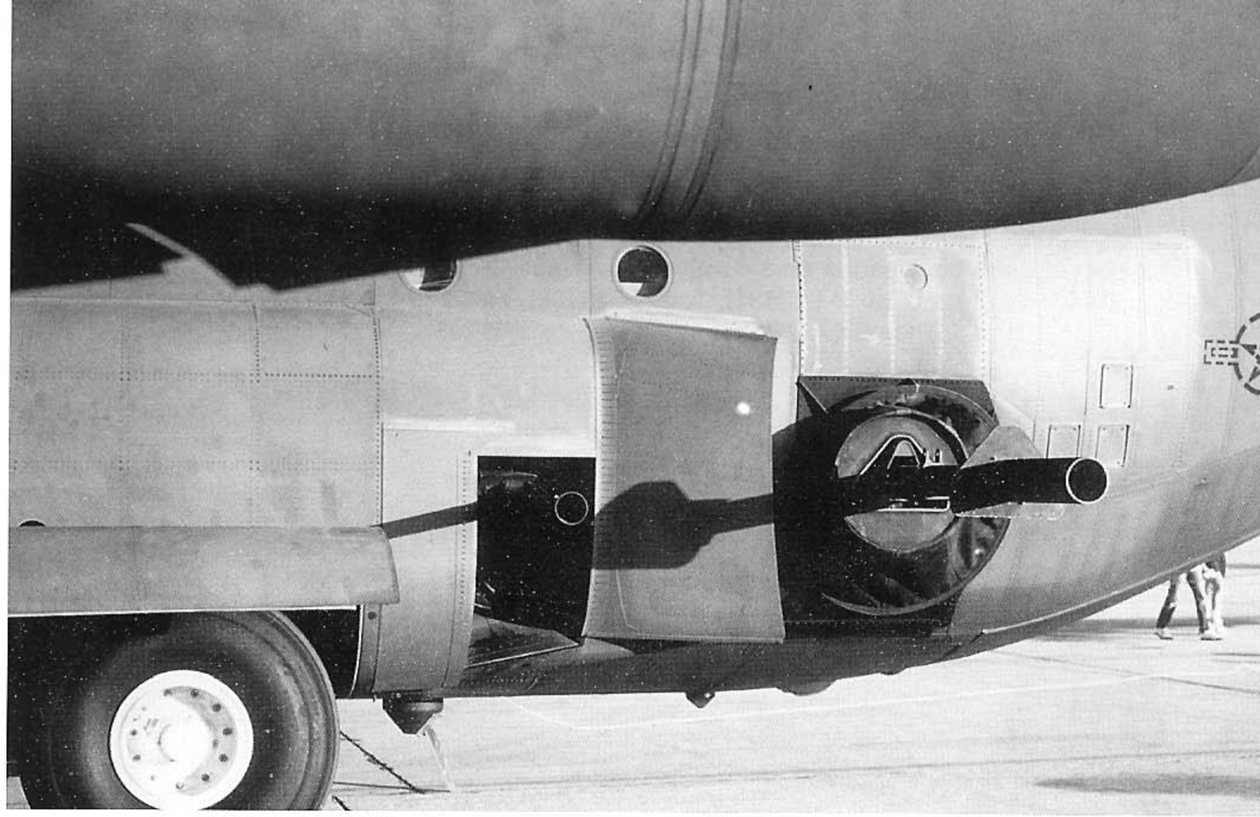
The shroud is removable for servicing and for flight away from high-threat areas. It also adds significant weight on the aircraft, which downgrades its performance. Hot gases are vented through the oval exhaust duct against the heat-treated metal of the nacelle and shroud base. (John Gourley)





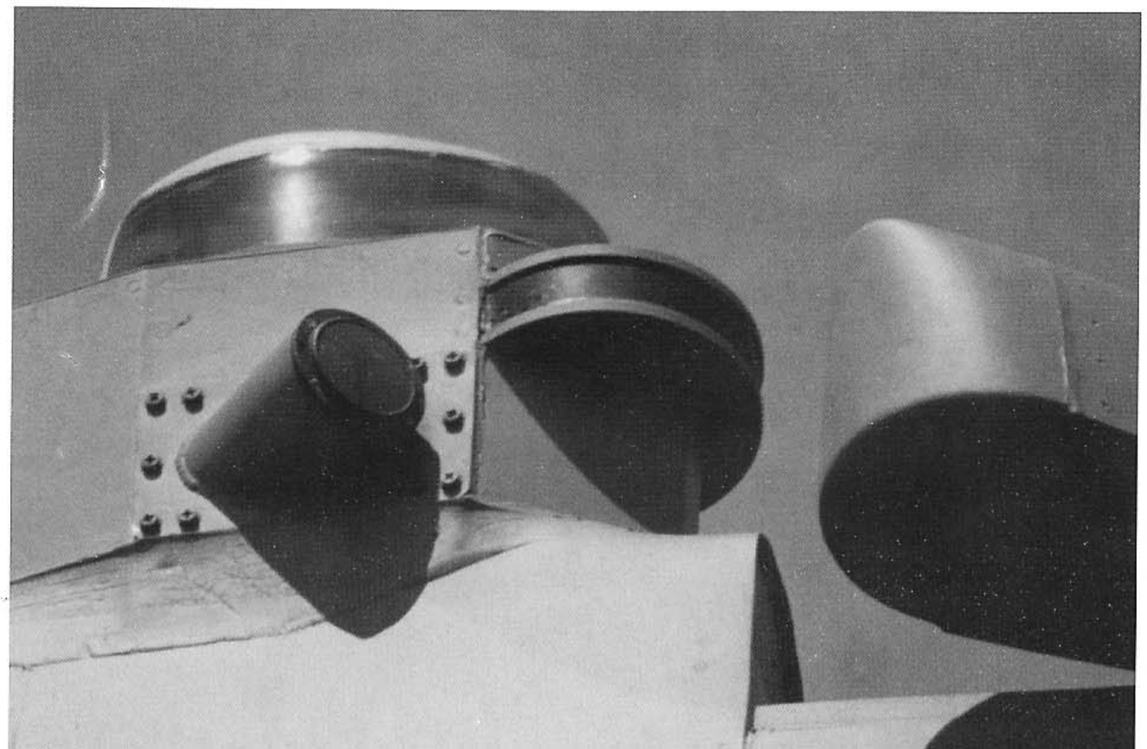


The 105MM M102 howitzer is installed on a fully trainable mount in the AC-130U's aft fuselage. This weapon fires both the 32.5 pound (14.7 KG) M-1m High Explosive (HE) round and the 34.2 pound (15.5 KG) M-60 White Phosphorous (WP) projectile. (John Gourley)

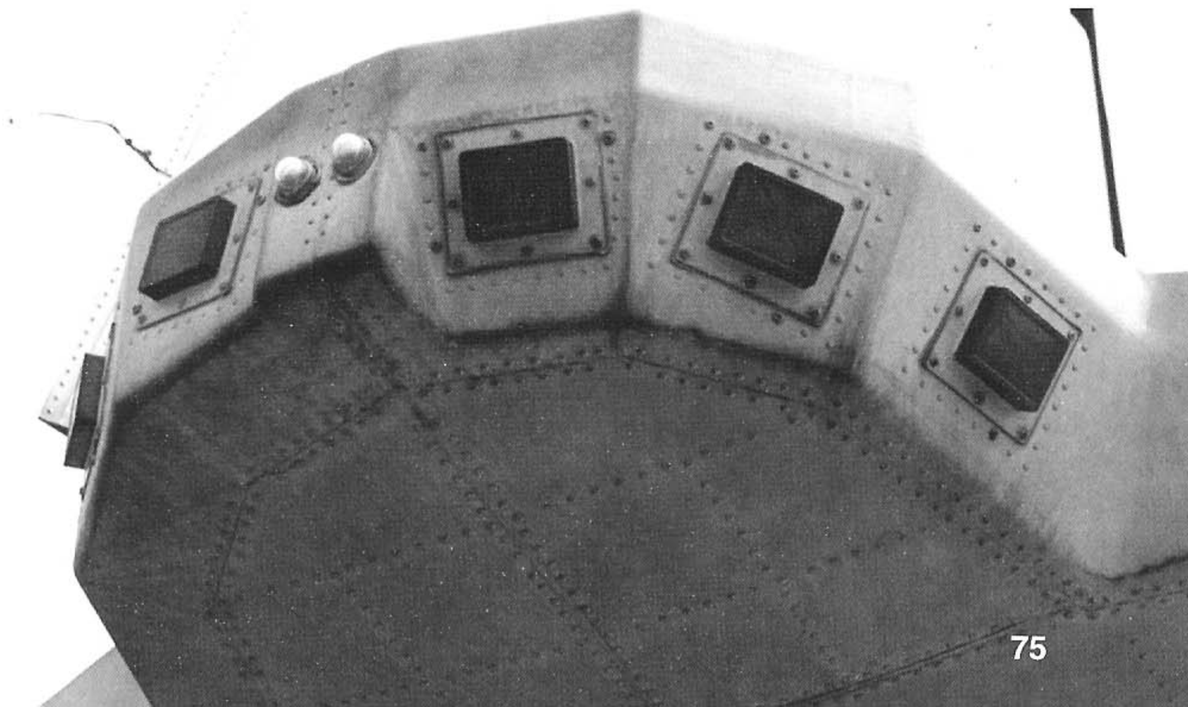


Flash suppressors are mounted on the AC-130U's 40MM and 105MM weapons to prevent their flash from giving away their position. These weapons are raised when the aircraft is on the ground. This Spooky II (89-0510) has a 1360 gallon (5148.1 L) fuel tank under the port wing. The AC-130U's first flight occurred on 20 December 1990 and the first operational aircraft was delivered to the 16th SOW on 1 July 1994. (Ted Carlson/Fotodynamics)

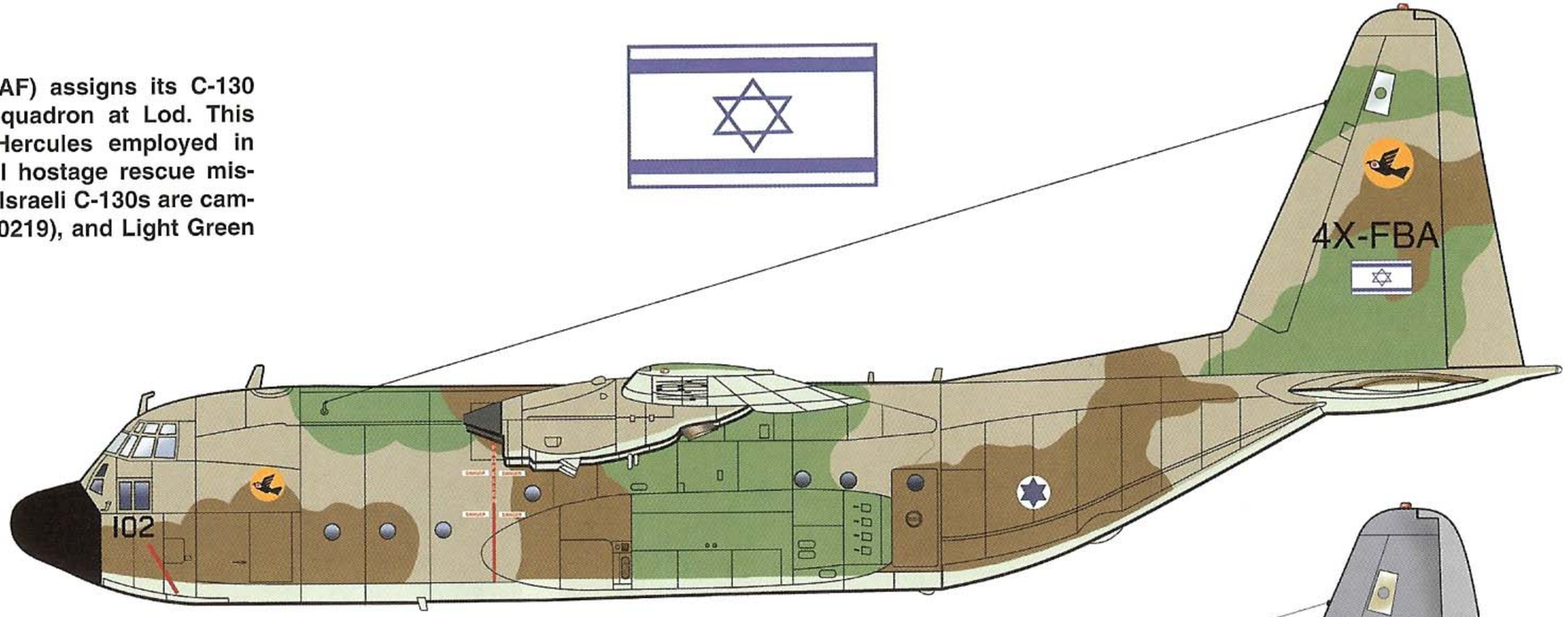
Aft-facing Lockheed Martin (Loral) AN/ALR-56M Radar Homing and Warning (RHW) antennas are amounted near the top of the AC-130U's vertical stabilizer. A red anti-collision light is mounted atop the fin for use in all flying conditions except covert missions. The rudder horn is fully deflected to port. (John Gourley)



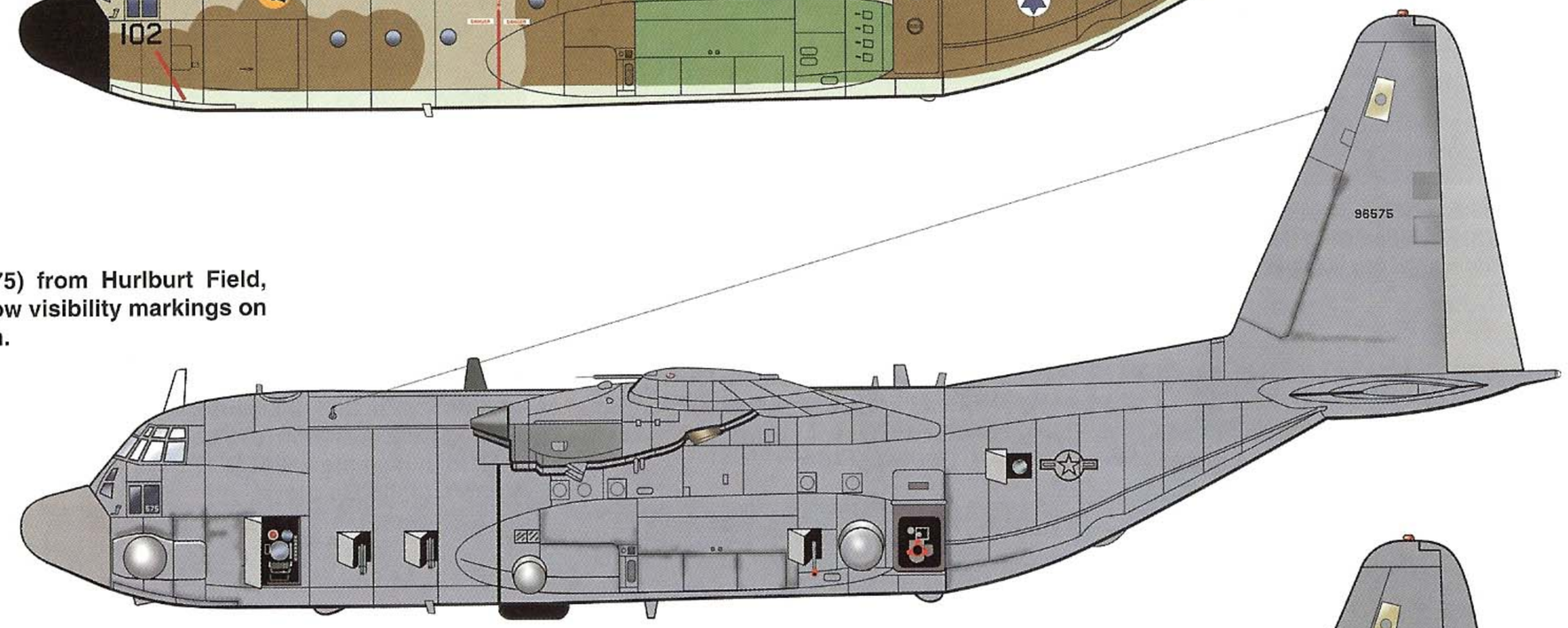
An ITT AN/ALQ-172 antenna array is mounted on the AC-130U's horizontal tail. This is one of the most complex jamming systems ever developed. It was originally installed in the Boeing B-52 Stratofortress bomber. A 1996 analysis of the per hour cost of operating the B-52 identified the AN/ALQ-172 system as the highest per hour cost of any system in that aircraft. (John Gourley)



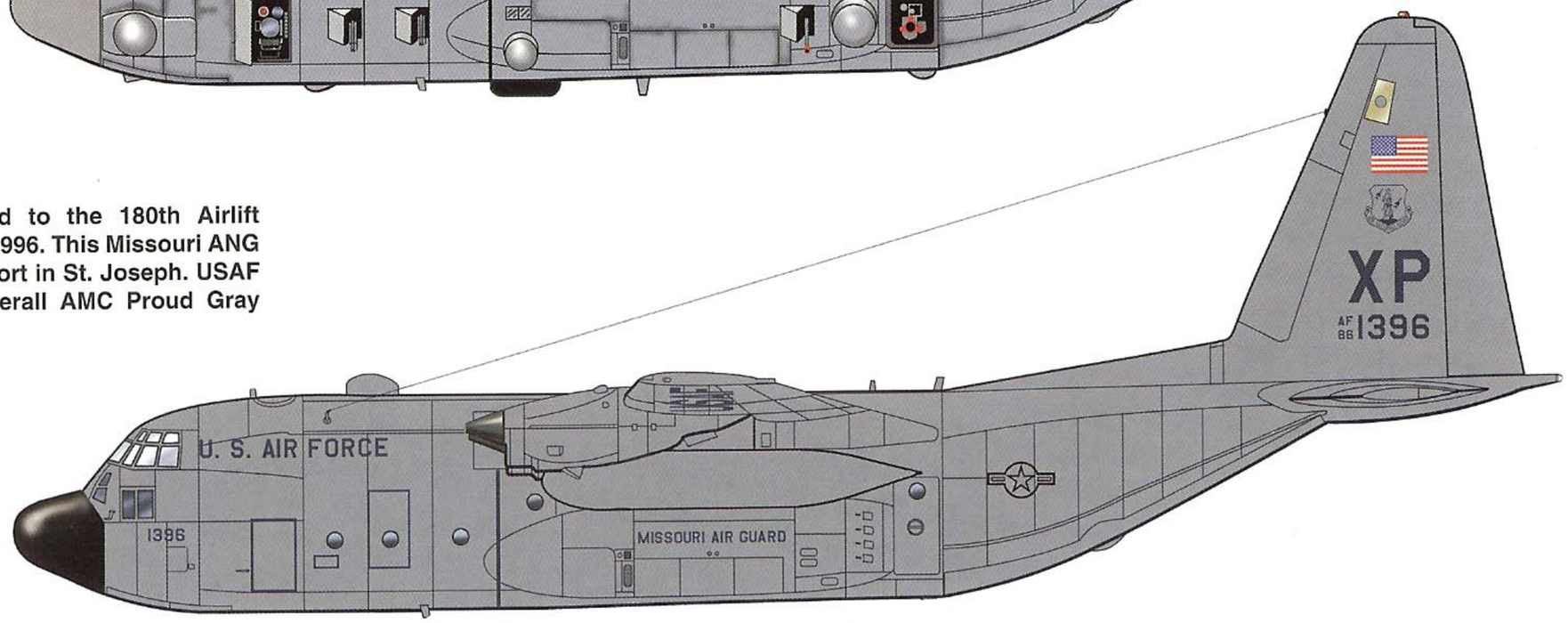
The Israel Defense Force/Air Force (IDF/AF) assigns its C-130 *Karnaf* (Rhinoceros) transports to 131 Squadron at Lod. This C-130H (102/4X-FBA) was one of four Hercules employed in Operation THUNDERBOLT, the successful hostage rescue mission at Entebbe, Uganda on 3-4 July 1976. Israeli C-130s are camouflaged in Light Tan (FS33531), Tan (FS30219), and Light Green (FS34227) over Pale Blue (FS35622).



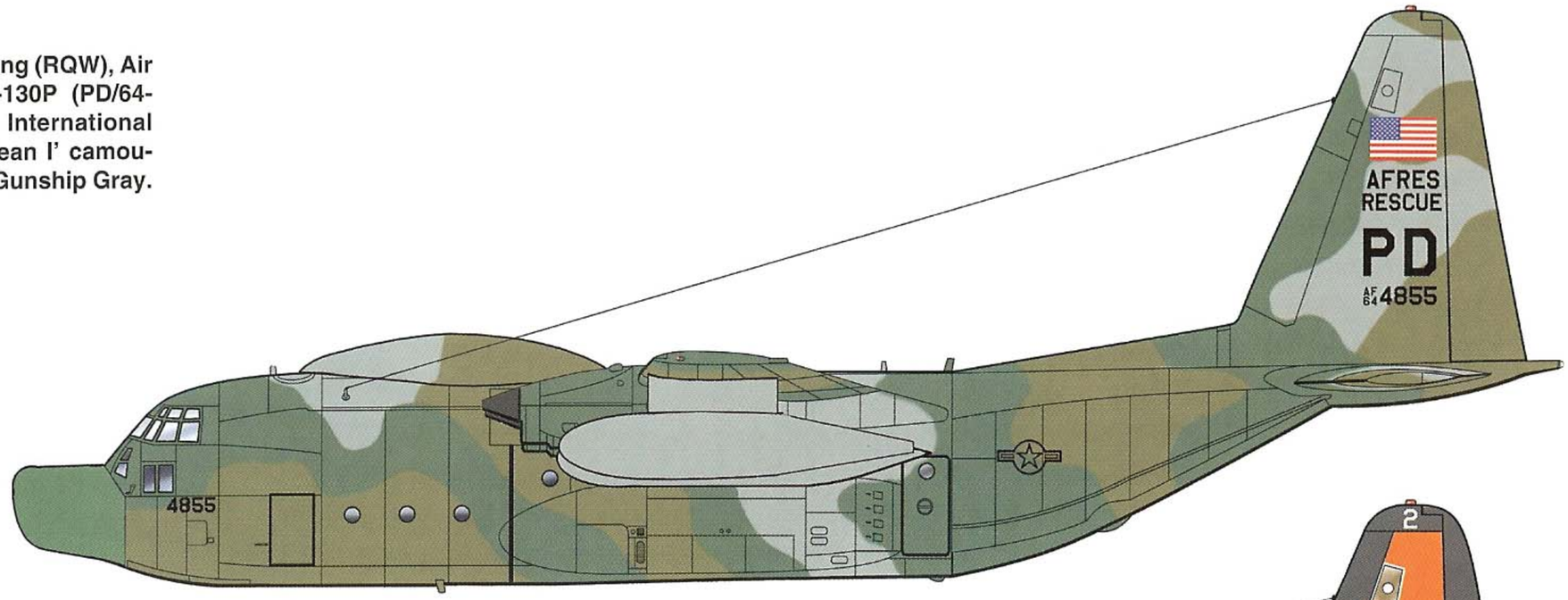
The 6th SOS flew this AC-130H (69-6575) from Hurlburt Field, Florida in June of 1978. The aircraft has low visibility markings on the overall Gunship Gray (FS36118) finish.



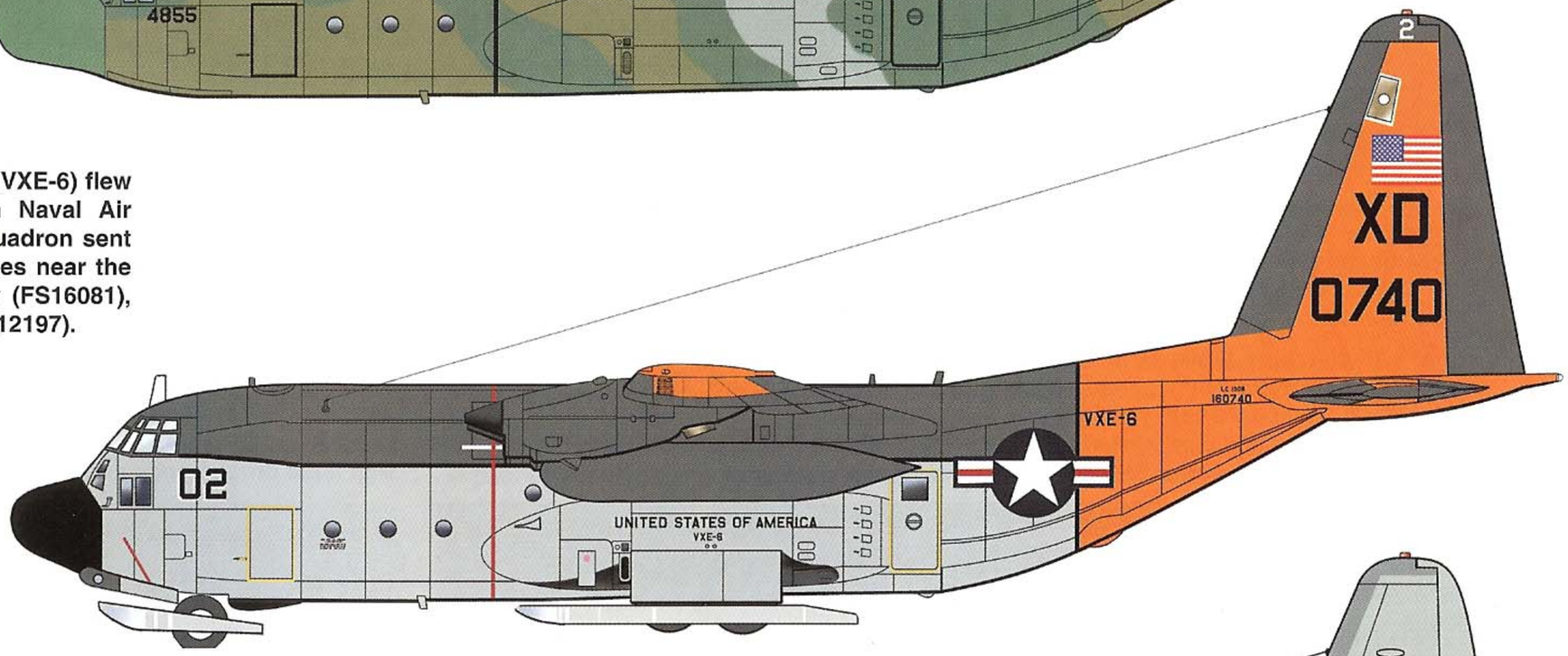
This C-130H (XP/86-1396) was assigned to the 180th Airlift Squadron (AS), 139th Airlift Wing (AW) in 1996. This Missouri ANG unit is based at Rosecrans Municipal Airport in St. Joseph. USAF Hercules transports are now painted overall AMC Proud Gray (FS26173).



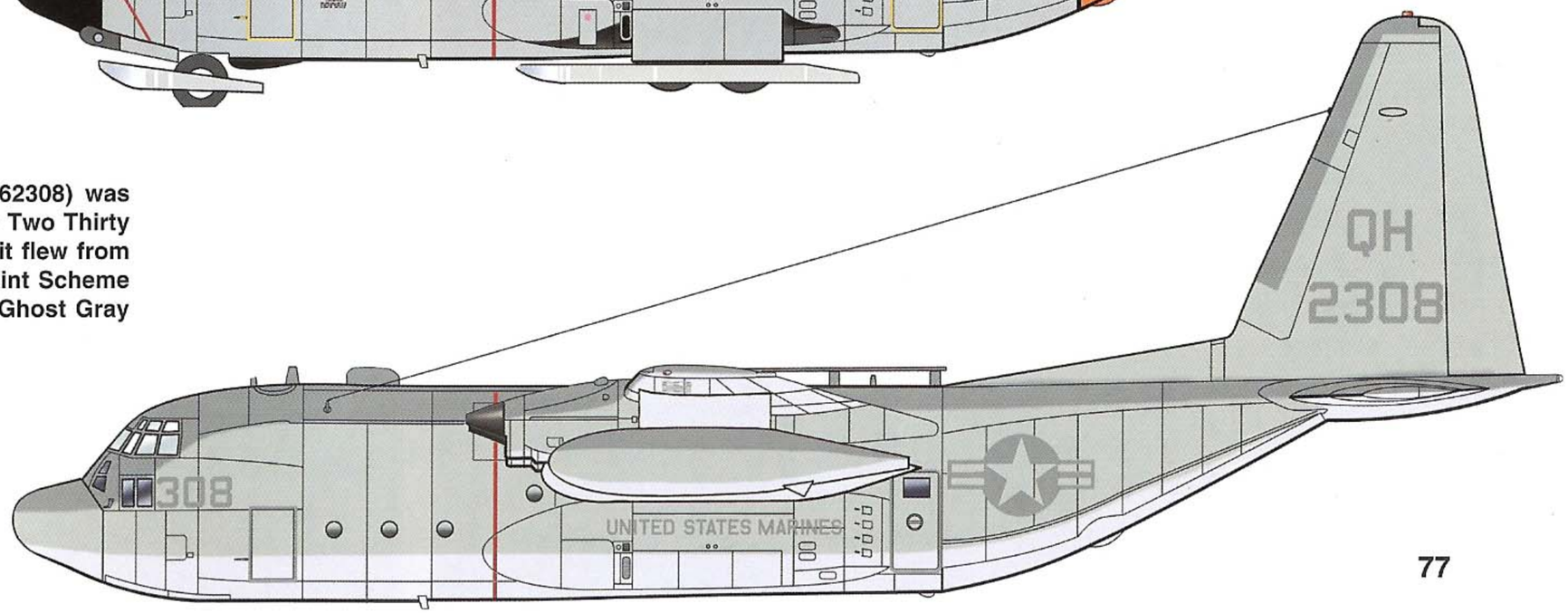
The 304th Rescue Squadron (RQS), 939th Rescue Wing (RQW), Air Force Reserve Command was assigned this HC-130P (PD/64-14855). The Squadron operated from Portland International Airport, Oregon. This Hercules retained the 'European I' camouflage of Dark Green, Gunship Green (FS34092), and Gunship Gray.



The US Navy's Antarctic Development Squadron Six (VXE-6) flew this LC-130R Hercules (XD-02/BuNo. 160740) from Naval Air Station (NAS) Port Mugu, California in 1990. This Squadron sent the ski-equipped aircraft to support US research bases near the South Pole. Primary aircraft colors are Engine Gray (FS16081), Aircraft Gray (FS16473), and International Orange (FS12197).



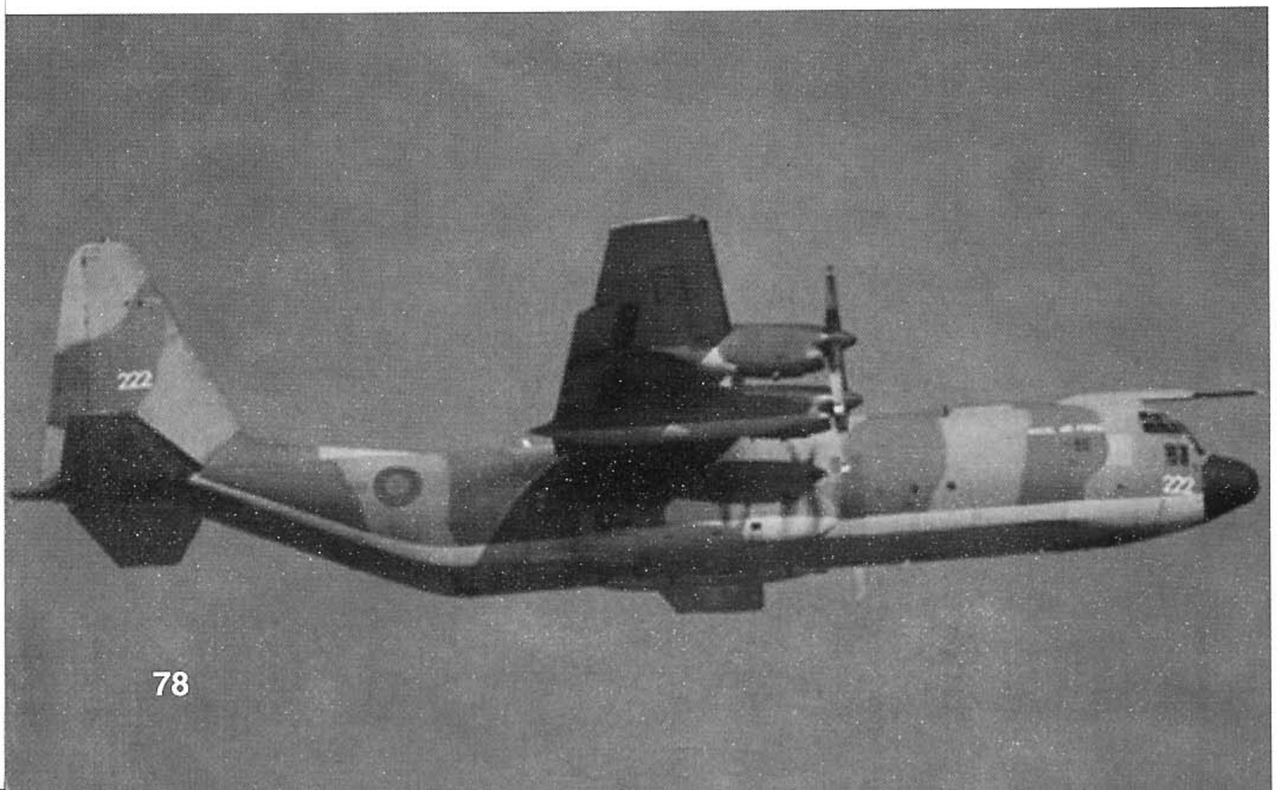
The first KC-130T tanker transport (QH-308/BuNo. 162308) was assigned to Marine Aerial Refuel Transport Squadron Two Thirty Four (VMGR-234) in 1998. The Marine Air Reserve unit flew from NAS Glenview, Illinois. It is painted in the Tactical Paint Scheme of Blue Gray (FS35237), Dark Ghost Gray, and Light Ghost Gray (FS36375).



A C-130E assigned to the 115th AS, 146th AW, California ANG flies a fire-fighting sortie on 1 October 1994. Temporary orange identification markings were painted on the 'European I' camouflage. Several ANG Hercules units are equipped to carry the Modular Airborne Fire Fighting System (MAFFS) in the cargo hold. MAFFS holds 3000 gallons (11,356.2 L) of fire retardant. (Vance Vasquez/NAWCWPNS)

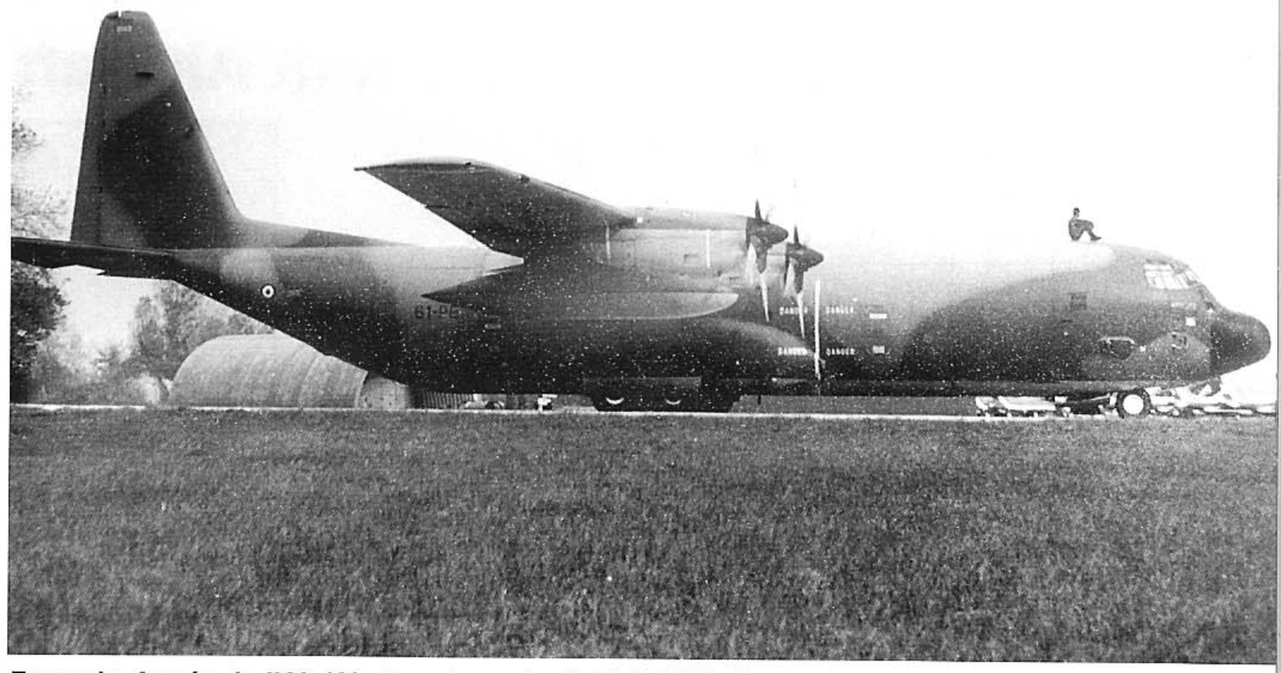
Two DC-130As (BuNos. 560514 and 570496) assigned to Composite Squadron Three (VC-3) are parked at NAS North Island, California. This drone director variant can carry up to four target drones – including Teledyne Ryan BQM-34 Firebee 1s – under the wings. The thimble nose encloses an AN/APN-45 tracking radar.

An RAF Hercules C.Mk.3P (Modified C-130K) (XV222) flies on a supply mission. The British converted 30 of their original 66 C-130Ks (Hercules C.Mk.1s) to C.Mk.3P (C-130H-30) standard between 1980 and 1985. The fuselage is stretched 15 feet (4.6 M) and an in-flight refueling probe installed. This stretch makes the Hercules C.Mk.3P unsuitable for rough field operations. (John Gourley)



This C-130H (312-03) was assigned to *Escuadron* (Squadron) 312, *Ala* (Wing) 31, *Ejercito del Aire Español* (Spanish Air Force). The Wing – comprised of Squadrons 311 and 312 – is based at Zaragosa, Spain. Several Spanish Hercules are KC-130H tankers, equipped with hose drogue pods under the outboard wings. (Manfred Faber)

From 1972, the *Aeronautica Militare Italiana* (AMI; Italian Air Force) accepted the first of their 14 C-130Hs, including 46-11 (MM61997/61-9970). This Hercules was assigned to 50° *Gruppo* (Squadron), 46ª *Brigata Aerea* (Air Brigade) at Pisa, Italy. The AMI accepted the first of six C-130Js ordered from Lockheed Martin in August of 2000. (John Gourley)



France's *Armée de l'Air* (Air Force) received 12 C-130Hs between 1987 and 1991. These included nine stretched C-130H-30s for long-range airlift, among them 61-PE (F-RAPE). The French Hercules are assigned to *Escadron de Transport* (Transport Squadron) 2/61 *'Franche-Comté'* at Orléans-Bricy, France.

This C-130H (1214) was one of two Hercules delivered to the United Arab Emirates (UAE) Air Force in June of 1981. This aircraft and two other C-130Hs are assigned to the Abu Dhabi Transport Squadron at Bateen, while two 'stretched' Hercules fly with the Dubai Transport Squadron at Mindhat. (Morten Grim Pliniussen)

This Hercules (1005) is one of two C-130Hs flown by *Fuerza Aerea Colombiana* (FAC; Colombian Air Force). It is assigned to *Escadron de Transport* 711, *Grupo* (Group) 71 at El Dorado, Colombia. Over 60 countries on every continent in the world have operated the Hercules. It has been operational for nearly half a century and there is every reason to expect that it may become the longest-serving aircraft ever built. (John Gourley)

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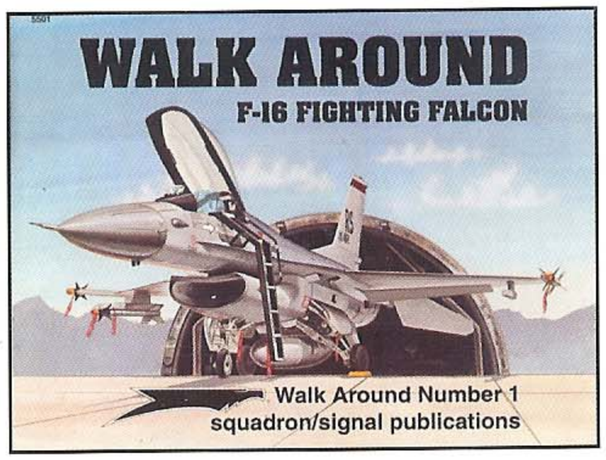
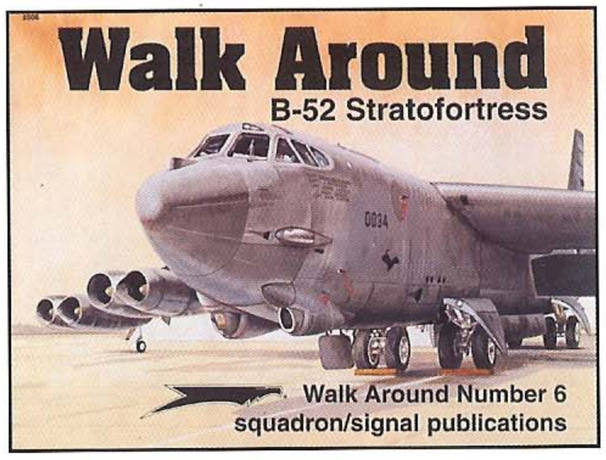
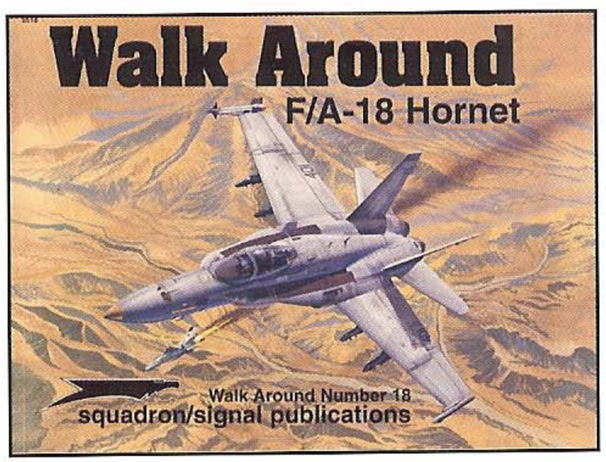


5501 F-16 Fighting Falcon

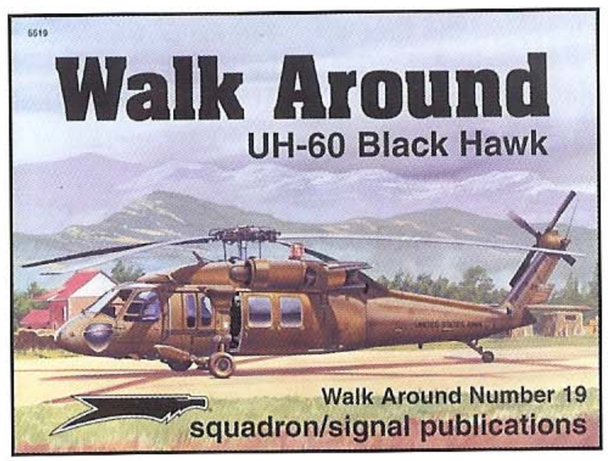
5503 F-14 Tomcat



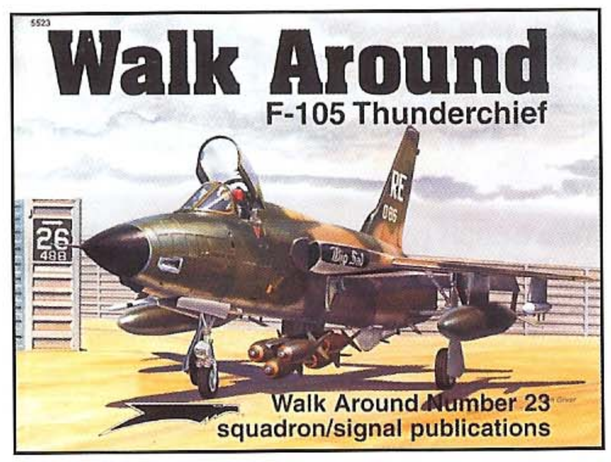
5506 B-52 Stratofortress



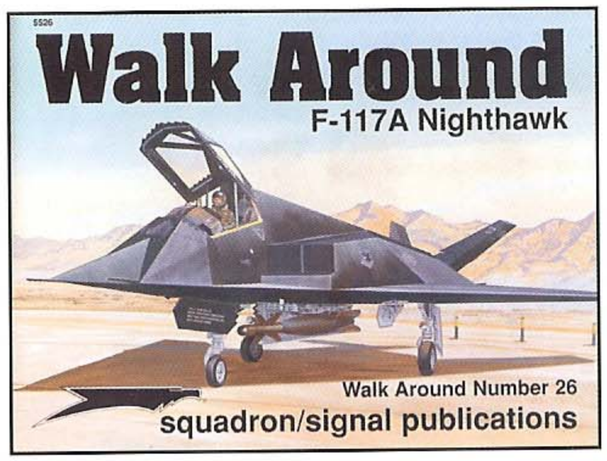
5518 F/A-18 Hornet



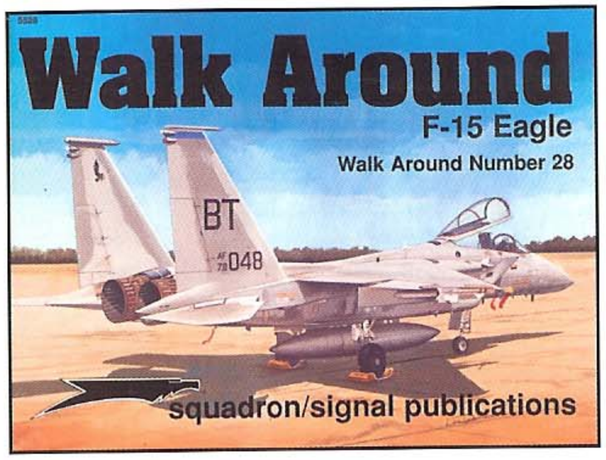
5519 UH-60 Black Hawk



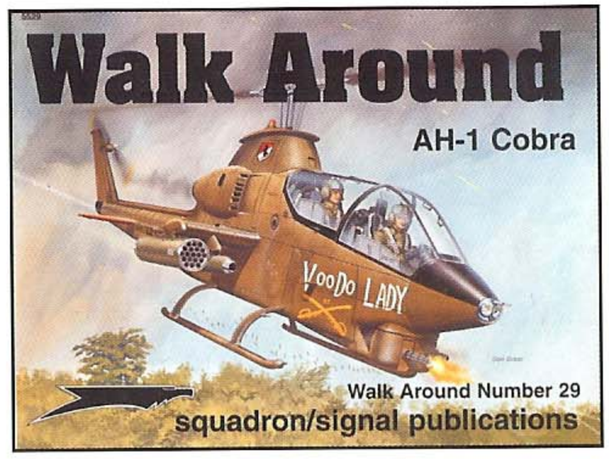
5523 F-105 Thunderchief



5526 F-117A Nighthawk



5528 F-15 Eagle



5529 AH-1 Cobra

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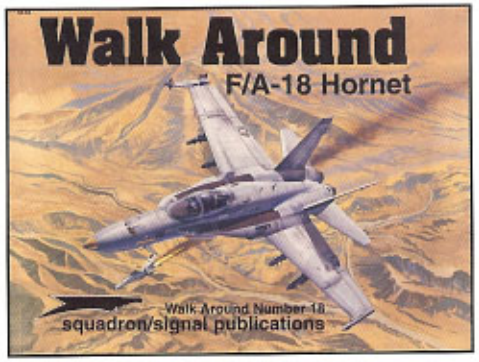
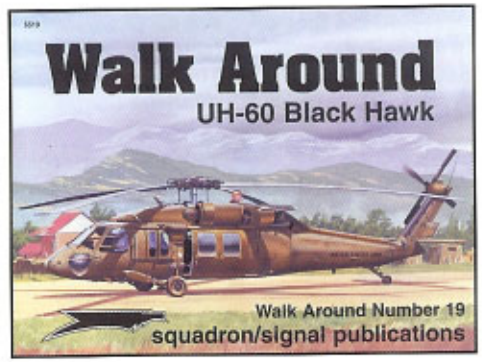
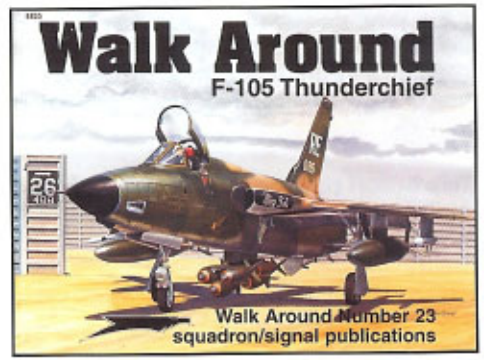


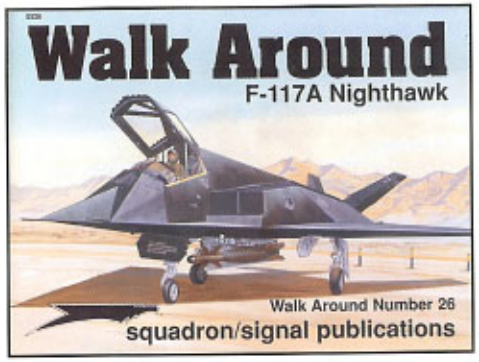
5518 F/A-18 Hornet



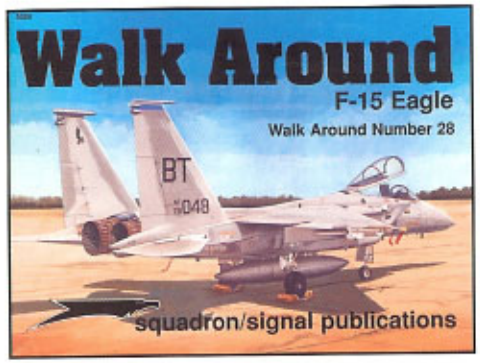
5519 UH-60 Black Hawk



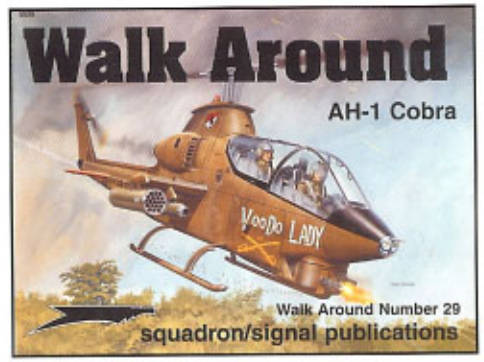
5523 F-105 Thunderchief



5526 F-117A Nighthawk



5528 F-15 Eagle



5529 AH-1 Cobra

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